

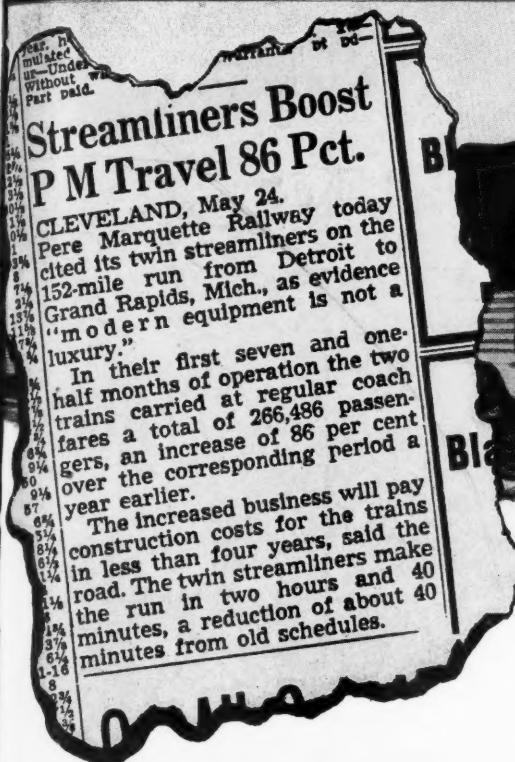
# RAILWAY AGE

SEPTEMBER 20, 1947

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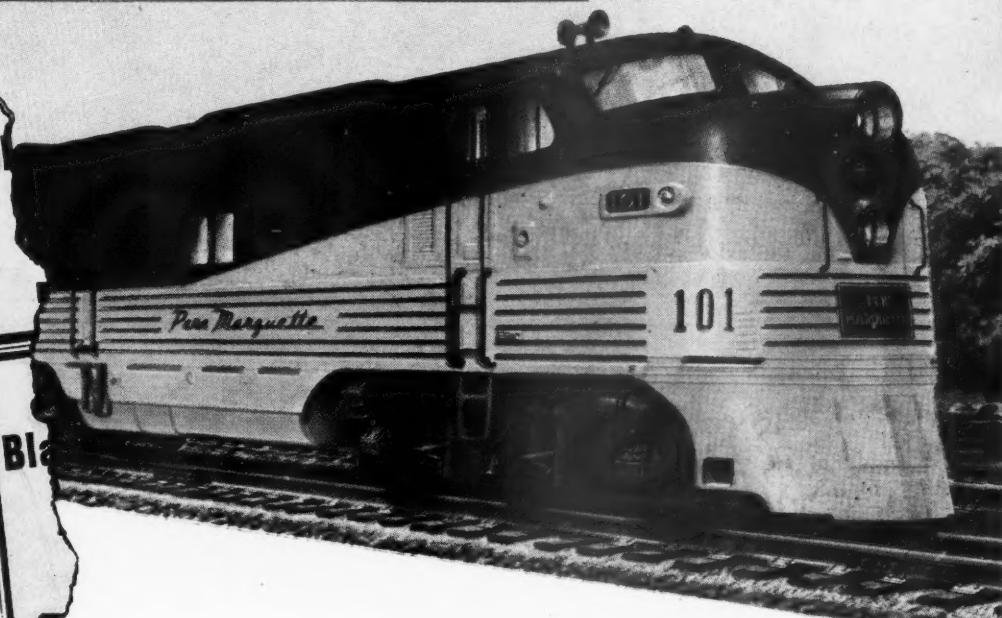
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\* For more details see August Ry. Mechanical Engineer (P. 408)  
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# The Week at a Glance

**SEEKING THE CENTRAL:** The testimony of Robert R. Young in support of his application for authority to become a New York Central director is the subject of one of our news section articles. As usual, the C. & O. chairman pays his respects to Wall Street and paints an exciting picture of the opportunities he sees for the railroads to get more business.

**SIGNAL ORDER DISCUSSED:** When railroad signal men get together as they did last week in Chicago the chief topic of conversation is likely to be the I. C. C. order requiring signaling installations of prescribed types on all lines where high-speed trains are operated. In addition to outlines of some of the committee reports submitted to the convention, our report of the meeting (page 60) quotes some of the comments on this dominant topic. A. A. R. Vice-President Aydelott was among those who questioned the commission's wisdom in putting all the railroads' safety eggs in one basket. Many capable railroad men are convinced, he said, that train speed *per se* is not by any means always the chief factor contributing to accident frequency. The advantages of the most advanced signaling devices are appreciated, but the A. A. R.'s top operating man brought up the familiar vexing and practical question: Where are the railroads going to find the money with which to pay for their wholesale installation without curtailing expenditures that, in their opinion, are likely to contribute even more effectively to safer operation?

**PRESTRESSING:** The technique employed in producing and installing prestressed concrete bridge beams, with which the London, Midland & Scottish is experimenting, is the subject of an illustrated article herein (page 54) by that British company's assistant engineer of structures. Among the advantages claimed for this design are the ease with which a ballasted deck can be employed (without incurring the difficulties associated with timber structures) and the cheaper first cost and decidedly cheaper maintenance, as compared with steel.

**RAILROADS ARE SPENDERS:** An inquisitive onlooker might very fairly direct a pertinent question to the rather numerous advocates of the beguiling doctrine that expanding "purchasing power" is the one key to permanent prosperity. High and higher wages are favored by them because "labor" thereby, in theory at least, secures more purchasing power. Artificially supported agricultural prices are favored to sustain the purchasing power of the farmers. And corporate profits are deplored because it seems to be one of the fundamentals of this brand of economic gospel that profits aren't expendable. But those whose one economic god is purchasing power aren't conspicuous in advocating measures to enlarge the railroads' purchasing power. That they aren't is remarkable, because the railroads have immense needs for equipment and materials and labor

to enlarge and modernize their facilities—needs that can be met only by immense purchases—and because the railroads have demonstrated, and are demonstrating this year, in the face of very serious discouragements, their willingness to spend freely when they have any money in the bank.

**FIGURES PROVE IT:** The railroads are so willing to spend, in fact, that it wouldn't be strange if a lot of their equity holders should consider them downright improvident. By conserving war profits that might reasonably have gone to stockholders as dividends the railroads have acquired some spending money. They are using this purchasing power rapidly, as the latest I. C. C. data show. The summary of capital expenditures of Class I roads, made or planned, which is reported in this issue (page 58), indicates that they contemplate outlays in 1947, in this one category, of \$952 million, which is 73 per cent over the comparable 1946 figures. How 1948 will compare will depend very largely on how much and how soon the railroads can increase their freight rates, and that will depend in part, probably, on how much public pressure is put upon the commission to permit adequate increases.

**THE REAL ESSENTIAL:** The relationship between a prosperous economy and the sustained employment of purchasing power is obvious, but the most important essential to the successful functioning of our private enterprise, high standard of living, system is not booming consumer purchases—it is a sound and enduring *balance* between all of the elements that enter into the system. Such balance did not exist after the first world war, our leading editorial points out, and the system slipped perilously close to total disaster. Such balance does not exist now.

**STEAM TURBINE-ELECTRIC:** The exhibition at the Atlantic City convention of the 6,000-hp. steam turbine-electric locomotive being built by Baldwin for the Chesapeake & Ohio brought up many pertinent questions. How is the power plant mounted? How is the steam flow to the turbine controlled? How is the control of turbine speed and generator output coordinated? Where is the electrical control equipment located? What provision is made for turbine bearing and gear lubrication? How are the generators and traction motors cooled? Such questions are answered in this issue's illustrated technical description of the locomotive design by two members of the engineering staff of Westinghouse Electric.

**BRIEFLY NOTED:** Elmer Monroe of the A. A. R. staff has turned out a significant analysis of the trend of railroad wages—and A. F. Whitney says the ops are going to ask for an increase of 30 cents an hour. . . . The Seaboard is readying a new Florida-New York streamliner. . . . The New Haven has asked for approval of another coach fare increase.

**WHO ARE THE "SHIPPERS"?** The private enterprise system is out of balance now because the railroads' revenues are not in proportion to the revenues of other industries, including agriculture. The balance can only be restored by increasing railroad rates adequately and promptly. In the interest of the economic system under which they operate—and with state socialism breathing down their necks from its firm base in Great Britain—the owners and operators of the country's farms and mines and factories and distributing trades ought to be supporting the railroads' efforts to restore the system's balance. But, with a few exceptions, the leaders of industry are conspicuously silent while the rate case drags through the commission's routine. The leaders are silent, but the traffic managers and lawyers they employ are outspoken enough in seeking exemptions for their individual industries from any and all rate increases. The *leaders* of industry should be speaking for the shippers in statesmanlike terms—but only the lawyers and traffic managers are talking.

**BOTH SIDES OF THE BENCH:** Shippers' traffic men are active in opposing rate increases that may apply to the commodities they deal in, but opposition to the whole idea of railroad rate increases is being led, in the Interstate Commerce Commission's Ex Parte 166 proceedings, by counsel and witnesses for the state utility commissioners. And while this group is taking this actively partisan part in the case, a committee of state commissioners sits with the I. C. C. members on the bench to give judicial consideration to the arguments made before the bench. This disturbing bifurcation of official responsibility is the subject of one of this week's editorials, and the progress of the hearings is reported in the article on page 64.

**NO STEEL—NO CARS:** The freight car builders are not going to be able to turn out the 10,000 cars a month the government agencies and the railroads are asking for, says S. M. Felton, unless and until they get a lot more steel for new car manufacture, not only in tons but in types, than they have been getting so far. This is the gist of a statement by the Car Institute head, reported in our news columns.

**PROPHETIES ON POWER:** Diesel-electric locomotive development will go a lot farther, according to Monon President John Barriger, whose "super-power" speech to the five coordinated railway mechanical associations meeting this week in Chicago is abstracted in this issue. Diesels will be shorter, with more horsepower per axle, and hydrogenation of coal into Diesel fuel or the perfection of a Diesel to operate on powdered coal will free the railroads from dependence on supplies of natural petroleum, he suggested. Although he does not expect any railroads except the heavy coal carriers ever to buy more reciprocating steam locomotives, he does see a bright future for coal-burning gas turbine power.

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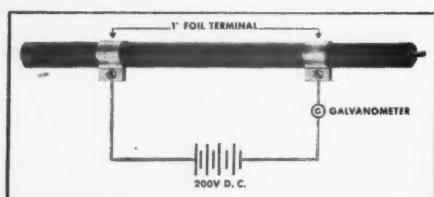
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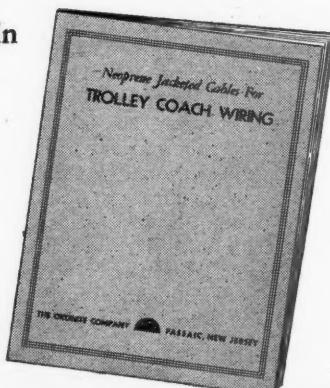


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# RAILWAY AGE

## *Freight Rates a Responsibility of Business Leadership*

The railroad freight rate case is affording another demonstration that either (1) many business men are not sincere when they profess wholehearted devotion to the system of private enterprise, or (2) they lack economic knowledge of what makes the system work, or (3) they let shortsighted selfishness dictate their reasoning. Nothing equals shortsighted selfishness to make most people quit thinking and begin grabbing.

The most important essential to successful functioning of the *system* of private enterprise is a *sound economic balance* between different important industries. The system was out of balance during the 20's because farm prices, and hence rural purchasing power, were too low as compared with industrial and transportation wages, prices, rates and purchasing power. Average income per capita of the 40 per cent of the people composing the rural population was only about two-thirds as large as average income of the urban population. This unbalanced condition was certainly one of the principal causes, and probably the principal cause, of the collapse of the economy and the beginning of the long depression.

### **A National Economy Out of Balance**

The private enterprise system is now out of balance again, this time because railway rates and profits are relatively so much lower than agricultural and industrial prices and profits. The railways have been doing a large amount of buying of equipment and materials with purchasing power that they accumulated by paying small dividends during the war. But their purchasing power was reduced by the abnormally small net earnings they made in 1946, and is being depleted again by small net earnings in 1947, especially in the last third of this year.

General business, and, therefore, the entire system of private enterprise in the United States, is heading toward a disaster which can be averted only by an adequate increase in railway net earnings caused by an early and adequate advance in freight rates. The net earnings of the railways must be increased to enable them to help maintain business by doing their share of buying of durable goods. The net earnings of the railways must be increased to enable them adequately to improve and expand their facilities, and thereby to enable other industries to expand their capacity and production.

The railways never were so efficiently operated as during and since the war. Yet during most of the war and ever since there has been a shortage of railroad transportation which steadily becomes more serious. Adequate expansion of the plant and production of other industries will be impossible without a large increase in the physical capacity of the railways. Only a large increase in railway net earnings can make possible this needed increase of railway capacity. Yet the halls of the Interstate Commerce Commission are jammed with lawyers and traffic managers opposing advances in the rates of industries that have raised their prices, *including those they charge the railways*, an average of more than 100 per cent.

### **Leaders of Private Enterprise Must Lead**

With all due respect for the *traffic managers* of industry, the present attitude toward advances in freight rates should be determined by the *leaders* of industry and agriculture. It is natural for the traffic manager of each big company or industrial or commercial organization to oppose any advance in rates that would have to be paid by those who employ him, in the hope that he may thereby get credit for minimizing the burden imposed on his employers as compared with that imposed on others. It is not the traffic managers, but the *leaders* of industry, who, by accepting the important positions of leadership in private enterprise, have assumed the responsibility of promoting both *business* and *government* policies that will help make the *system* of private enterprise work successfully. And the *system* cannot work successfully unless the rates and earnings of the private enterprise railways are kept in balance with the prices and earnings of other industries.

### **Learning from the Last Postwar Period**

Business leaders did not live up in the 20's to the responsibility they had voluntarily assumed, and the economic system collapsed. Government then began adopting "recovery" and "full employment" policies leading toward state socialism. Many business leaders who failed in the 20's to adopt and advocate sound policies have since been freely criticizing unsound government policies. Business leaders cannot discharge the responsibility they have voluntarily assumed merely

by criticizing others. They did virtually nothing to solve the farm problem which existed during the last postwar period. If they have learned by the nation's subsequent experience, they will act, in the interest of their own industries and the entire economy, to prevent the railroad problem from dragging all private enterprise down in this postwar period as the farm problem dragged it down in the last postwar period.

## A Matter of Principle

Interstate Commerce Commission Chairman Aitchison is reported to have remarked recently, in response to a lawyer's question, that things haven't yet reached the point where commissioners testify in cases before them. But things have reached the point, it appears, where some state commissioners are assuming the roles of partisan advocates in an issue submitted to them in their judicial capacity.

The Interstate Commerce Commission shares with the regulatory agencies of the individual states some of its responsibility for determining the reasonableness and adequacy of railroad freight rates. Following its usual practice, it has invited a panel of state commissioners to sit with it during the *Ex Parte 166* hearings now in progress. In these proceedings, therefore, as in any consideration of proposals for rate increases that may be made in the several states, the state commissioners are in the positions of judges or arbiters—charged with the duty of weighing impartially and objectively the railroads' arguments in support of their rate proposals and the shippers' arguments against them.

It would appear to be altogether fitting that the "cooperating committee" of state commissioners should sit in judicial majesty on the I.C.C. dais, hearing the testimony and arguments of proponents and opponents of the rate increase, so that they may come to an informed conclusion about the merits of the proposal—that is, it would be if there were no grounds for doubting the collective enthusiasm of the state commissioners for this typically American way of seeking a just resolution of conflicting interests. But is it surprising that such doubt does exist when one of the most conspicuous of the resourceful and voluble lawyers for the opponents of a freight rate increase is the general solicitor of the National Association of Railroad and Utilities Commissioners?

If it is the commissioners' counsel's purpose only to accelerate the proceedings and to preserve the integrity of his employers' impartiality he is failing signally in his assignment. But it is much more likely that he speaks for a determining number of state commissioners who have formed their opinion about the merits of the railroads' case before the evidence has been put before them. If it is not true that their minds already are made up, that they already have forsaken judicial neutrality to take leading places in the ranks of the opponents of a rate increase, then they are singularly remiss in guiding their counsel's arguments and examination of witnesses.

When the umpires whose first duty is to conserve the public interest thus takes sides in a controversy of immense public significance, it is high time for those

## Where Profits Go

Profits, and particularly the profits of great individual units thereof, have been the target of convinced reformers throughout the history of industry. They misconceive the nature of profits and the function these perform. To put it more simply, they don't know what becomes of profits. They think of profits as something withdrawn from production for the personal enjoyment of the recipients.

Whereas the fact is that over the run of years only a part of industry's profits are used for personal expenditures. Both parts re-enter the stream of economic activity through different channels. What owners withdraw for personal use is added to the general demand for consumption goods or "consumers' durables," like houses and motor cars. The other part of profits is transformed into the expanding equipment of manufacturing and service industries to produce more things for a growing population bent on raising its living standards.

Profits engender employment, not because of the altruism of the reputed profiteers but because no other realization of profits as profits is possible. It is a fact both grim and salutary that industry must reinvest a great proportion of its profits to remain profitable.

—*The Wall Street Journal*

who pay the umpires' wages to become alarmed. The ability of the railroads to survive as private enterprises may be threatened by the partisanship of these public officers, as it has been before, and that is a matter for public concern, but more important still—because the survival of democratic government is involved—is the danger that other administrative agencies and the courts may be tempted by their prejudices to indulge themselves in similar deviations from the straight path of judicial rectitude.

## Pallliatives vs. Permanent Cures

In dealing with defects in the fixed properties railroad engineering departments and top managements frequently have to decide whether to spend a relatively small amount of money to do what is recognized as only a partial job or to spend much more money in an all-out effort to overcome the bad condition. In making such decisions it is often easy to disregard the long-term aspects of the problem and to decide on the smaller expenditure, hoping to "get by" in this manner.

Experience has shown, however, that frequently the most economical approach, in the long run, is to take the plunge in the first place, spending as much money as is necessary to correct the basic difficulty causing the trouble. In one case a railroad worried along for years trying to maintain a stretch of track where the subgrade material had cemented together in a solid mass that had then broken up into large chunks, creating an exceedingly unstable foundation for the track. After many years, during which various attempts were made to deal with the effects rather than the causes

of the trouble, it was recognized that the only alternative to a continuance of excessive upkeep costs in this territory was to take the expensive step of correcting the basic difficulty. Consequently, the track was taken up and the offending material was removed in its entirety, to be replaced with a more appropriate material. The result was an immediate reduction of the maintenance costs to a normal figure.

In another instance the difficulties engendered by a high, unstable fill had plagued a railroad for more than 30 years. During this period, while the cause of the trouble was recognized, only makeshift corrective measures were attempted because it was felt that the expenditure required to get at its root would be exorbitant. Finally, a cool-headed appraisal of the situation led to the conclusion that the savings and other advantages to be realized over a period of years would justify almost any expenditure required to overcome the basic difficulty.

These examples have their parallels on almost every road. In both instances the companies involved could have avoided excessive maintenance expenditures over many years by correcting the fundamental weaknesses in the first place. In similar situations elsewhere it is only good business in each case to balance the amortized annual cost of a *complete* job of correction, no matter how large it may be, against the anticipated savings in maintenance expenses—and equally good business to undertake the work if satisfactory net savings are indicated.

In the medical field it is considered futile to treat symptoms when organic defects are present. Similarly, when dealing with bad conditions in railway fixed properties a major operation may offer the only hope of obtaining a permanent "cure."

### Optimistic Leadership

The fate of the railroads is today in the hands of the Interstate Commerce Commission. Never in their long history have the railroads been in greater need of prompt and intelligent consideration at its hands.

We are not pessimists in the railroad industry. If we were, we would not be in this business. We look across the Atlantic and see the British railroads about to pass into government ownership and operation the first of the year. That does not alarm us, but it gives us pause. It is a sobering thought to realize that after the first of the year the railroads of the United States and one railroad in Canada will be the only privately-owned and operated railroads in any major country on the face of the earth. Our country really doesn't want government ownership of its railroads. A recent poll of public opinion showed a lesser percentage wanting government ownership than any previous poll had ever shown.

Our railroads will survive the pressing problems with which we are now confronted if the Interstate Commerce Commission deals promptly with this rate application in the statesmanlike way of which it is capable. The railroads will survive in private enterprise and go on to greater accomplishments than have yet been dreamed of, if they have the militant support of all who are really interested in better rail transportation.

—William T. Faricy, president of the Association of American Railroads, in an address to the Traffic Club of New York.

## Periodic Repairs to Steam Heat Equipment

The two principal objectives of railway efforts in repairing and reconditioning passenger-car heating systems for winter service are to make passengers more comfortable and to prevent train delays due to steam heat failures. Additional important requirements are to do the work with minimum expenditures for labor and material and, if possible, without holding equipment out of service longer than necessitated by other repairs.

In the past, steam heat equipment repairs on most roads have been allowed to lag during the early summer months, with the result that much of this work has to be done in a comparatively short period just prior to the heating season. This obviously does not promote efficiency. It is too late to do much about changing the practice this year, but, looking into the future, progressive engineers, representing both railways and heating supply companies, believe that greatly improved service and substantial economies may be effected by periodic inspection and repairs of steam heat systems in passenger cars, with the work spread over the entire summer rather than concentrated in a few weeks as is now too often the case.

Experience shows that annual inspection and overhaul of detail parts are essential to satisfactory operation of older types of heating equipment. With greatly improved designs developed and installed on many of the newer passenger trains, the reconditioning period may be extended to two years, particularly for underneath equipment such as pressure regulators and the new steam traps. Other parts, such as end valves, automatic admission valves, control panels and thermostats, still need thorough inspection and repairs on an annual basis. The equipment should be stencilled or metal tagged to show the date of inspection or overhaul, so that periodic repair work can be programmed and followed up as is done with journal boxes, air brakes and air-conditioning parts.

One particular advantage of orderly procedure in scheduling heating equipment repairs over a longer period is that time is available for sending detail parts to central system shops, where specialized inspection and repair tools and test equipment are available and trained personnel can do the reconditioning work much better and quicker than when it is attempted at less well-equipped outlying yards or repair points.

One such centralized shop, recently organized and equipped on a large midwestern railroad, has already demonstrated marked economies in repairing and reconditioning parts of steam heat systems for further service. Flexible metallic steam heat connectors, for example, are sent once a year from all over the system to this shop where convenient means are provided for quickly dismantling and reassembling all parts; special gages show which parts must be scrapped and which reclaimed by machining or, possibly, by building up worn places by welding; trained personnel perform and supervise all operations; and special test equipment assures reliable, reconditioned connectors which are good for another 12 months of service.

Steam heat equipment is of course only one example of the many car and locomotive details which need periodic attention to assure satisfactory service at minimum cost.

# C. & O. Turbine-Electric Locomotives

**By T. J. PUTZ**

Manager, Gas-Turbine and Locomotive Engineering  
Steam Turbine Division  
Westinghouse Electric Corporation  
South Philadelphia, Penna.

and

**C. E. BASTON**

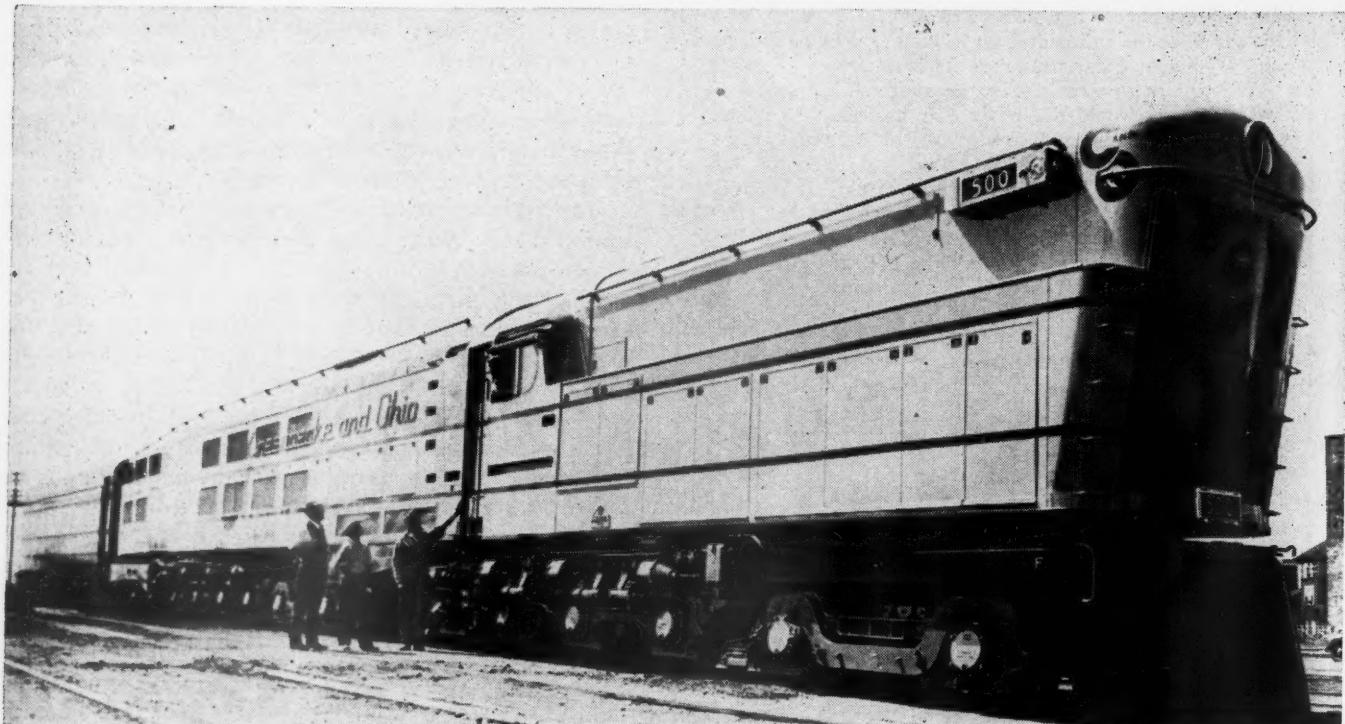
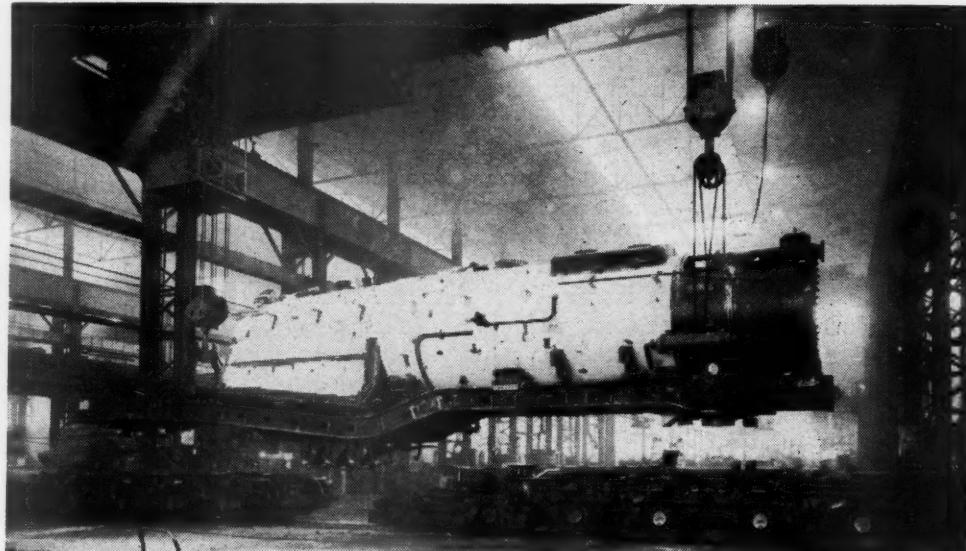
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THE three Chesapeake & Ohio turbine-electric locomotives which are being built by the Baldwin Locomotive Works, and which were described briefly in the June 23, 1947, daily issue of the *Railway Age*, are a combination of standard, well-developed elements in a non-conventional arrangement. From front to rear these are: coal bunker, operating cab, boiler (turned end-for-end), and propulsion-equipment compartment. Water is carried in a separate tender coupled behind the locomotive.

The locomotive employs a conventional fire-tube boiler. It supplies 85,000 lb. of steam per hour at 290 lb. per sq. in. gage pressure and 750 deg. F. total temperature to the turbine nozzles. With this steam flow and with 15 lb. per sq. in. gage exhaust pressure, the turbine develops 6,000 hp. at 6,000 r.p.m. at the pinion coupling. The turbine exhaust is used to produce draft by means of the conventional ejector front-end arrangement.

Space and weight restrictions posed

Right—The boiler which is a conventional fire-tube type being lowered on to the trucks. Below—First of the three Chesapeake & Ohio steam turbine-electric locomotives



**Conventional boiler supplies steam to a 6,000-hp. turbine at 290 lb. and 750 deg. superheat—Control is obtained by generator field excitation and variation of turbine speed**

many new problems in the design of the main power plant consisting of steam turbine, a 6-to-1 gear, and two generators. It was not practical to build the locomotive frame rigid enough to maintain satisfactory alignment of the rotating parts. This necessitated a self-

design for all possible inertia and torque load conditions.

The high-speed turbine is coupled directly to a pinion that, in turn, drives two gear wheels, each connected to a generator. These elements are combined to form a single assembly that in-

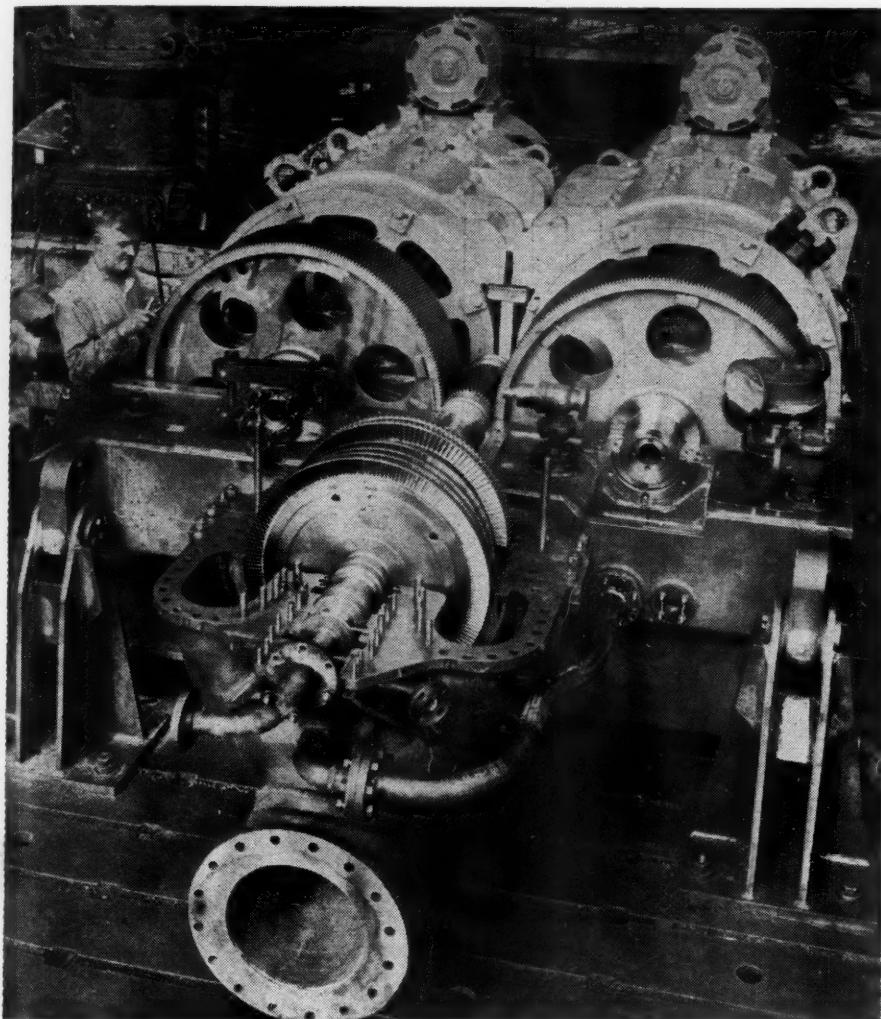
to the units that might disturb the shaft alignments.

The steam-turbine is of the impulse type and consists of a velocity-compounded, impulse-control stage followed by four-full-admission impulse stages. Steam flows to the turbine through a seven-valve steam chest cast integral with the turbine-cylinder cover. Each valve is connected by a cored passage to a nozzle group that admits steam to a portion of the control stage. The valves are of the single-seated diffuser type all connected to a common lift bar. The individual valve stems permit sequential opening of the valves thus minimizing the throttling loss at any opening. The governor-operated hydraulic piston raises and lowers the valve lift bar through a yoke and link. A mechanical strap-type transformer governor, which is driven from one of the low-speed gear shafts, positions the hydraulic operating piston.

The throttle valve, eight inches in diameter, is located on the side of the steam chest. It is arranged to close on turbine overspeed and is also fitted with an emergency quick-closing control operated from the cab. The throttle valve is connected with a single supply pipe from the superheater header located in the smoke box.

The turbine and gear sleeve-bearings are lined with tin-base babbitt. The turbine and pinion shaft is positioned by a segmental type thrust bearing located at the exhaust end of the turbine. Each low-speed gear-wheel journal bearing has a thrust collar that positions the gear and generator shaft.

An oil reservoir of approximately 200 gal. capacity is built into the gear-case assembly. For starting, an oil pump driven by a steam turbine provides oil for governor operation, bearing lubrication and gear sprays. When the unit is brought to idling speed, the oil-pump turbine is stopped and oil circulation is provided by a positive-displacement gear-type pump, connected by a quill to one of the low-speed gear shafts. The oil system contains a magnetic strainer and a shell and tube type cooler that is cooled by the boiler feedwater. Automatic bypass controls regulate the oil temperature leaving the cooler. The oil pump discharge pressure is approximately 70 lb. per sq. in. A portion of



The power plant with upper turbine and gear casings removed

contained assembly that is merely supported and restrained by the locomotive frame so no frame deflection is transmitted to the unit. Because of the complexity of the structure required, a one-quarter scale model was made and tested to prove the adequacy of the

includes an oil reservoir and all auxiliaries. The unit is supported and restrained in the locomotive frame at three points, namely, two trunnions at the forward corners and a rubber supporting pad between the generators. This arrangement prevents stresses being transmitted

the oil is required to operate the governor. The remainder, reduced in pressure through an orifice, is used to lubricate the journal bearings and gears.

### Generators

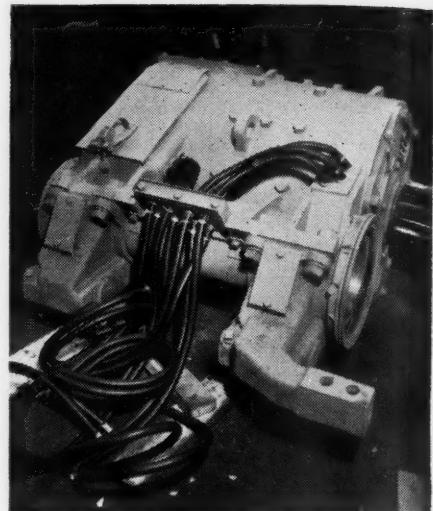
The generators and the motors are of the types that have proven successful in Diesel-electric locomotive service. The armatures of the two generators are mounted on the gear shaft with the commutators facing outward. The outer end of each generator shaft carries a pulley that drives through multiple V-belts an auxiliary generator mounted on top of the main generator.

A turbine-driven vertical propeller-type fan mounted on one side of the main turbine supplies air to the space between the two stators of each double generator. From this point the air flows in both directions toward the commutators thus carrying any carbon dust out of the machine. An auxiliary duct carries cold air directly to the generator commutators.

The main generators are eight-pole, multiple-wound, commutating-pole, direct-current machines provided with two windings on the main poles. The main exciting winding is connected to the armature through a regulating resistor. A field-discharge resistor is connected through a Rectox unit to prevent excessive voltages when opening the field circuit. The regulating resistor is variable in two steps. The first is sufficiently high to prevent uncontrolled build-up. The second permits maximum voltage to be obtained. The change-over is under control of a voltage relay connected to the generator armature.

The separately excited field is controllable in eleven steps by the master controller, which obtains its power from the exciters.

Each of the four generator armatures supplies power to two 620-hp., 568-volt, 720-r.p.m. (type 370-F) traction motors connected in parallel. These are six-pole, series-wound, axle-hung d.c. motors, geared with single-reduction spur gearing to the driving axles. They are force-ventilated by air from turbine-driven vertical propeller type fans through ducts built into the locomotive underframe. One fan is located on the front end, in front of the coal bunker, supplying air for the three traction motors mounted on the front truck. The fan for the five motors on the rear truck is mounted on the opposite side of the main turbine from the generator blower. All of these fans are equipped with centrifugal-type air cleaners that



One of the eight 620 hp, type 370-F, traction motors

air-scavenging system is provided that will be operated occasionally on each run.

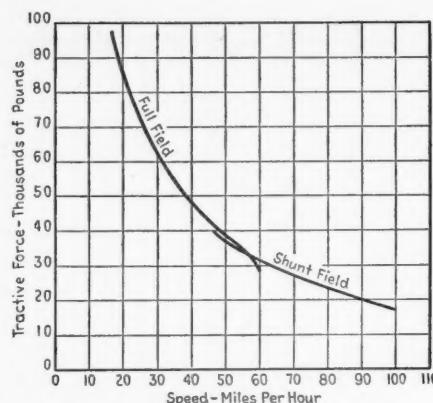
### Electrical Control

The electrical control differs from that used on Diesel-electric locomotives in that part of the acceleration is obtained by varying the strength of the separately excited fields of the main generators and part by speed control of the turbine. To obtain a satisfactory water rate, the speed of the turbine is not reduced below 60 per cent of full speed in the idling position of the controller.

The control equipment for the main generators and the motors mounted on the rear truck is in a compartment behind the generators. The control equipment for the motors on the front truck is under the coal bunker.

The master controller, located at the engineman's position, has two handles, one to control speed and the other to control direction. When the speed handle is moved from "Off" to "Idle," steam is admitted to the turbine, bringing it to the idling speed—about 3,500 r.p.m.

This is the condition employed when the locomotive is stopped for short periods, as at stations. Moving the controller to the first speed position applies excitation to the generator fields and power to the traction motors while movement successively through ten additional positions increases the power incrementally to the point that maximum separate excitation has been applied to the generators and the turbine speed is increased to 75 per cent of full speed. The self-excited field is also connected to position one, but has little effect until the generator voltage increases. Further movement of the master controller



Speed tractive force curve for the C. & O. 6,000-hp. steam turbine-electric locomotive



The operator's position. The coal space is forward and the boiler head is behind the operator

remove a large portion of dirt and cinders drawn with the ventilating air. Thus comparatively clean air is supplied to the electrical apparatus.

Because this is a coal-burning locomotive, it was felt desirable to take special measures to provide the electrical equipment with air free from smoke and steam. To do this, all air for the blowers is taken into the locomotive forward of the stack. A bulkhead separates the blowers in the rear compartment from the generators so recirculation of air is negligible. The electrical control equipment is separated by removable doors from the heated air discharged from the generators. This compartment is arranged for ventilation with outside air in summer and with heated air to prevent condensation in winter.

The ducts discharging the dirty air from the cleaners to the outside cannot be made as short and straight as is desirable, consequently a high-pressure

increases the speed of the turbine to its top limit.

A meter panel is provided at the engineman's position to indicate the traction motor current and the turbine speed. These meters are lighted at night with ultraviolet light ("black light"), which eliminates glare and affords maximum eye comfort for the engineman. A buzzer is provided to indicate wheel slippage; and lights to indicate tripping of overload relays, operation of ground detector, functioning of blowers, temperature and pressure of lubricating oil.

The traction motors are connected to the generators by electro-pneumatic unit switches. The fields of the traction motors are connected to a drum type reverser which in turn is controlled by the reverse camshaft of the master controller.

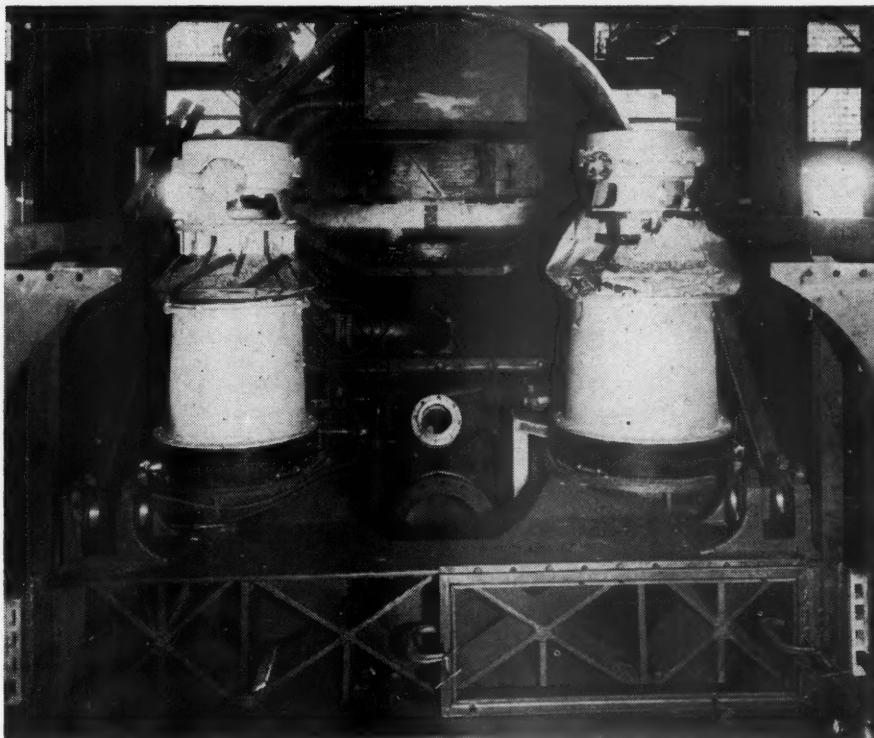
### Wheel-Slip Warning

One step of field shunting is provided by a non-inductive resistance connected across the motor fields by an electro-pneumatic switch. This switch is controlled by a voltage relay connected across the generator armature.

The slip relays are connected between the two traction motors connected to the same generator. The connection is made between the armature and field in each case. As long as the counter electromotive force and consequently the speed of the two motors is equal no current passes through the relay. As soon as a wheel slips, the counter electromotive force of its motor increases, a current passes through the relay and it closes its contacts, thus operating the warning buzzer. It does not shut off or reduce power.

Overload relays in each motor circuit are set to trip at the maximum accelerating tractive force. If any of these overload relays operate, the emergency trip magnet valve is de-energized and the governor closes immediately, thus relieving the overload. Before load can be re-established the master controller must be moved to the "Off" position.

Any generator armature and its affiliated traction motors can be disconnected should trouble occur in any of these



Turbine-driven, propeller type fans ventilate the traction motors

machines. In that case, three-quarters of full capacity is still available.

Two 9-kw., 75-volt generators (Type XG-51) supply auxiliary power although either one alone has sufficient capacity to supply the maximum load. This results in increased reliability. A single

These generator-excitors also supply power to the air brake system and to the mechanical lubricator pump motor. This latter device is also controlled by the master controller which stops it when the locomotive is at rest, thus preventing waste of lubricating oil.

Table II  
Equipment on C. & O. Steam Turbine-Electric Locomotive

Turbine	1	impulse type, consists of a velocity-compounded impulse-control stage followed by four-full admission impulse stages
Generators	2 (each double-armature)	Type 473-AR and AL
Amperes continuous per armature	1,760	
Volts continuous per armature	568	
Kilowatts continuous per armature	1,000	
Speed, r.p.m.	1,000	
Traction motors	8	Type 370-F
Horsepower at shaft, continuous	620	
Amperes	880	
Volts	568	
Speed, r.p.m.	720	
Auxiliary generators	2	Type XG-51, 9 kw., 75 volts, 120 amp.
Gearing		Main unit Pinion—45 teeth, 6DP, 9 deg. helical angle Gear—272 teeth, 6DP, 9 deg. helical angle
		Traction motors Pinion—24 teeth, 2DP, 6 in. face spur Gear—55 teeth
Blowers		Steam turbine driven, propeller type fans Generator blower ..... 24,000 c.f.m. No. 1 traction motor blower ..... 9,000 c.f.m. No. 2 traction motor blower ..... 15,000 c.f.m.
Control		Manual, by change of governor setting and change of generator fields
Air Brake		W.A.B. Co. type 24 RL with steam driven compressors

regulator controls both generators and they are paralleled through a balancing resistor. Either may be cut out without in any way affecting the operation of the locomotive.

Considering the size of this locomotive, the control equipment is extremely simple while permitting operating at any point on the controller for any desired length of time.

Table I  
C. & O. Steam Turbine-Electric Locomotive

Tractive force (continuous) .....	48,000 lb.
Speed at continuous tractive force .....	40 m.p.h.
Maximum starting tractive force (limited by traction motors) .....	98,000 lb.
Maximum speed (limited by traction motors) .....	100 m.p.h.
Turbine output (at 290 lb. gage, 750 deg. F. steam, 15 lb. back pressure) .....	6,000 hp.
Turbine speed .....	6,000 r.p.m.
Weight of electrical equipment .....	151,845 lb.
Weight of turbine-generator unit .....	83,000 lb.
Weight of traction motor .....	7,380 lb.

# Coordinated Mechanical Meeting Opens

Five associations hold convention with exhibits at Chicago — First session addressed by J. W. Barriger

ONE of the finest examples of cooperative effort by railway men was afforded at Chicago this week when five groups of supervisors in various classes of mechanical department work held simultaneous four-day annual meetings at the Hotel Sherman from September 15 to 18 inclusive. These different groups included the Railway Fuel and Traveling Engineers' Association, Car Department Officers' Association, Master Boiler Makers' Association, Locomotive Maintenance Officers' Association and the newly reorganized Air Brake Association.

In addition to individual addresses and committee reports bearing on almost every kind of mechanical problem now confronting the railroads, the educational value of this convention was greatly enhanced by extensive exhibits of both time-tested and new locomotive and car appliances, materials, shop tools and devices. These exhibits, provided by the Allied Railway Supply Association, exceeded in number and variety any similar exhibition ever held in the Middle West.

At a joint opening session of the five associations, with the president of each

seated on the speakers' platform and about 800 railway mechanical supervisors and guests in the audience, Chairman F. P. Roasch outlined the general objectives of the conventions, urged active participation in the discussions by all members, particularly the younger men, and explained the necessity of visiting and studying all of the exhibits in order to keep in touch with new developments which have such an important bearing on railway service and efficiency.

Chairman Roasch introduced John Hall, director of the Bureau of Locomotive Inspection of the Interstate Commerce Commission, also M. K. Tate of Lima Locomotive Works and C. F. Weil of the American Brake Shoe Company, president and secretary-treasurer, respectively, of the Allied Railway Supply Association. At the request of the chairman, S. O. Rentschler, president of the Locomotive Maintenance Officers' Association and general manager of the Elgin, Joliet & Eastern, introduced the principal speaker of the opening session, J. W. Barriger, president of the Monon. Excerpts from Mr. Barriger's address follow.

a tiny fraction of the railway network. Until the progress of science permits electric power to be transmitted from central stations without wires and cables, the only means of providing electric railway traction without costly overhead or third-rail transmission systems is to have the source of electric power made an integral part of the electric locomotive, just as the boiler is of the steam type. This not only dispenses with the need of electric power distributing facilities but makes the electric locomotive as flexible as its steam counterpart. . . .

The switcher provided the Diesel engine with its first introduction to freight service and the rail car to passenger work. Most switching requires low horsepower but high tractive force and ability to accelerate rapidly at low speeds. The Diesel engine, with the direct-current generator and motor, have ideal characteristics to meet these requirements. Moreover many switching assignments are "around the clock" on a 24-hr. continuous basis. Steam switchers usually lose the equivalent of one shift of the three for servicing, and are forced to take time out during the other two for refilling the water tank. Diesel switchers can run continually with only about one 8-hr. shift lost per month for routine servicing and repairs. An average of 7 gal. of fuel oil will be consumed per hour by a 1,000-hp. switcher, in ordinary work. This totals 168 gal. per day. Several days' supply is carried in the fuel storage tanks under the locomotive and these can be filled, if necessary, from tank trucks sent out from the enginehouse to meet the switcher on the job. This high availability, and low fuel consumption in comparison with steam, due to elimination of standby losses and reduced servicing and repair costs, give the Diesel a great advantage in ordinary terminal and yard work. One Diesel can perform the work of two or more steam switchers and unit costs per hour represent a substantial saving over that possible with steam service. For a time there was the additional benefit resulting from one-man operation of the Diesel which needs no helper, but the railroads later agreed to assign a second man on switchers weighing 90,000 lb. or more, hence the popularity of the 44-ton unit for light work.

The Diesel started in passenger service propelling small rail motor cars and

## Super-Power for Super-Railroads

By J. W. BARRIGER

President, Chicago, Indianapolis & Louisville

Tractive force is the basis of railway service and hence is the source of railway revenue. It is therefore the product which railways manufacture. This factor establishes locomotive operation as the fundamental element in rail transportation. It follows that the nature and detail of a railway plant are determined by the limitations and requirements and opportunities of the locomotives which use it. Improvements in standards of service and efficiency stem largely from management's unrelenting demands for continued development of the locomotive to haul longer trains faster and at lower unit costs. . . .

The development of the locomotive is the gage of railroad progress, but the reverse side of the coin is the fact that any inadequacies in service or excesses in unit costs suggest deficiencies in motive power standards of efficiency or utilization. The same forces which spur

progress in steam locomotive design and construction also produce attempts to short circuit it and seek completely new sources of motive power. The revolutionary progress of the electrical industry in the early decades of this century stimulated immediate interest in the possibilities which this type of energy might possess to release the railroads from some of the familiar handicaps of the steam locomotive.

### Electric Traction

Electric traction permits the highest possible standards of locomotive operation. The barrier to its immediate universal use was the high capital cost which restricted installation of the originally required electric power distribution system to super density lines, or ones with tunnel or terminal or suburban passenger problems, and these entail but

provided surplus power sufficient to haul no more than one or, at the most, two light trailers. Trains of this character were very useful on light traffic branch lines. In 1934-35 the Burlington and the Union Pacific designed trains which were planned to utilize the highest available capacity Diesel engine suitable for transportation purposes to propel trains of specially-designed cars built of high-tensile alloy metals. The Diesel engines were placed in a power car which became an integral part of the train. These new trains were sensational success and within a very few years created a widespread demand for a service of that character.

The resultant development of Diesel motive power led to the development of Diesel locomotives which were no longer a mere power-car portion of an articulated train, but were completely flexible units that could be used wherever desired. The rapid development of this type of power soon permitted locomotives of 1,800 hp. capacity to be built which utilized two 900-hp. engines in a single cab. Two or more of these units could be coupled for multiple operation controlled from the forward one.

It is significant to observe that the first Diesel-electric road locomotive was Canadian National's No. 9000, built in 1928. It comprised two cabs each equipped with 1,330-hp. Beardmore Diesels which gave 2,660 hp. for the complete locomotive. The progenitor of C.N. 9000, which is "the daddy" of all road Diesels, was the late Sir Henry Thornton, and Diesel motive power on the National during his regime could well be pointed to as proof of the general outline of the foregoing remarks about the early history of this type of locomotive.

Diesel locomotive development has followed that of the steam locomotive and can be gaged by horsepower output. As fast as it progressed to higher ranges, new and more important assignments opened up for it. Diesel motive power is now available in such a variety of types and capacities that a Diesel locomotive can now be secured which will perform most assignments better and more economically than steam power.

### Further Improvement Sure

The spectacular progress of Diesel locomotive development and its economic superiority over the reciprocating steam locomotive should not however make anyone indifferent or complaisant towards those of its characteristics which are not wholly satisfactory or are underdeveloped. The great manufacturers of these machines are striving for improvement of their products and are aided in their efforts by the experience and co-operation of the railroads. It is reasonable to expect that the rate of progress

of Diesel locomotive development over the next decade will equal or surpass that of the last one.

At the present time 6,000-hp. Diesel locomotives are approximately 200 ft. long and require the support of 16 axles, all motor driven, if the consist is four 1,500-hp. cabs, or 18 axles, of which 12 are motorized and 6 idlers, if the pattern is three 2,000-hp. cabs. I venture the opinion that ten years hence, or possibly much sooner, Diesel locomotives of increased power output will not exceed 125 ft. in length and will consist of a single articulated unit.

The present small-diameter driving wheels, directly geared to a single traction motor mounted in swivel trucks, are more akin to car than to locomotive design. In a Diesel locomotive of the character suggested, two large motors will turn each set of driving wheels and their torque will be transmitted through the quill form of spring-cushioned drive to the spokes of large-diameter wheels, journaled in the locomotive frame, thereby following the present practice of all electric locomotives.

### Only 400 Hp. Per Axle

Steam locomotives now transmit as high as 1,000-1,250 hp. per axle. Diesel locomotives do not transmit more than 400 hp. per axle. While recognizing that this difference underlies the high initial starting tractive force of the Diesel, this in itself becomes of no practical value when it exceeds the capacity of the drawbars of the cars in the train to transmit it. Diesels have such an inherently large starting tractive force that some of it can be sacrificed if need be to reduce locomotive length and remove all time limitation on slow-speed operation with high drawbar pull. As the length of Diesels is compressed and their overall weight per horsepower reduced, the power transmission per axle will approximate that of steam locomotives.

Every four years the railroads spend the equivalent of their original investment in steam locomotives in repairs to them and the gross annual expenses of owning and operating steam locomotives represent about 75 per cent of the original cost of these machines. It is obvious from such basic considerations that an important capital investment is justified to obtain the economies that follow Dieselization.

Steam engines were first used to pump water out of coal mines, and in both England and America railroads were built to haul coal before any were used for the commercial transportation of freight and passengers. When to these historic factors is added the development of the coal industry into the principal traffic base of the railways of

the United States, it is clearly apparent that recent advances in locomotive technology placing new locomotives on liquid instead of solid fuels would develop some important strains and dislocations except for economic events which produced more than offsetting demands for coal.

However, it is important for many reasons for railways to return to coal for fuel. It now seems unlikely that any railroads except those so closely linked to the coal industry as the Norfolk & Western, Chesapeake & Ohio, Virginian, and Clinchfield will ever again order any substantial numbers of reciprocating steam locomotives. I believe that the coal-burning gas-turbine locomotive will be successfully developed as a prime mover to turn the generator of self-contained electric locomotives of near future years.

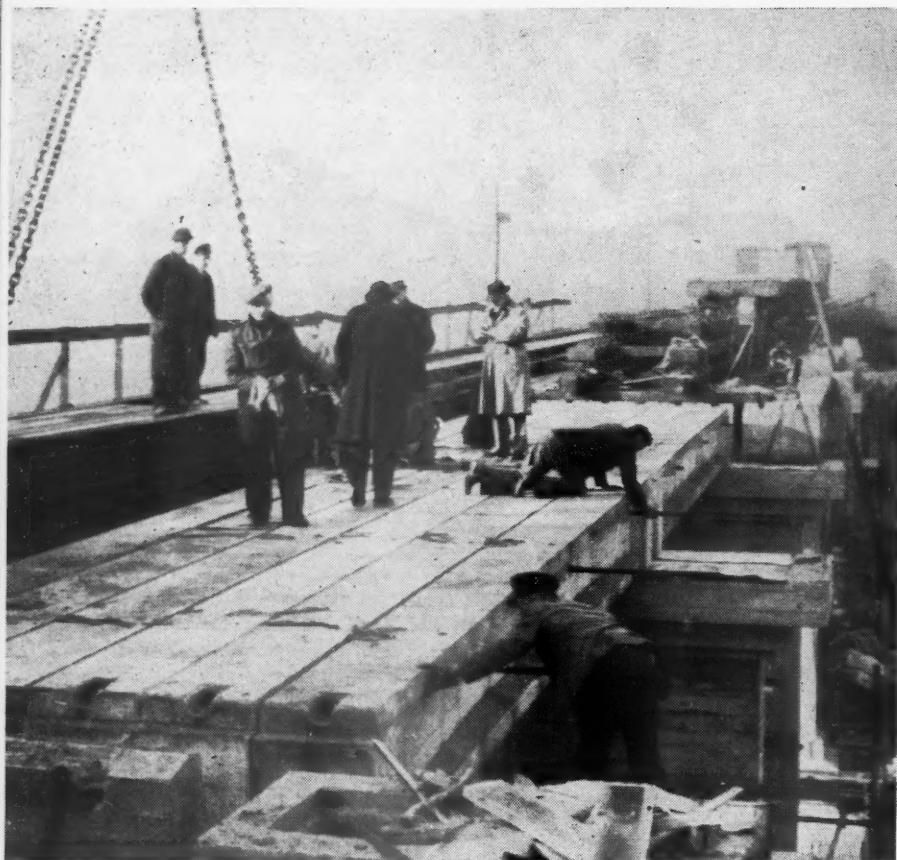
### Coal Hydrogenation Suggested

It may be, however, that a quicker recovery of the position of coal as locomotive fuel can be effected by hydrogenation of it into a Diesel oil. Great progress has been made in this direction and now that the problem of providing sufficient petroleum for the nation's liquid fuel requirements is becoming acute, railroads may soon be able to have their Diesel locomotives and burn a liquid fuel in them that has been produced from coal instead of petroleum.

One must never forget that when Rudolph Diesel made his great invention, he was really searching for a device to burn coal in an internal-combustion engine. He expected to use liquid fuel in its elementary stages of development, but intended to perfect the device for injection of solid fuel in powdered form. His untimely death and subsequent developments in the petroleum industry removed the pressure and incentives to achieve Diesel's full ambition—but the time seems ripe to do it soon. Certainly the problems of solid-fuel injection and disposal of the waste products should not be beyond the possibility of solution by the resourcefulness and talent and scientific ingenuity of industry's engineers.

From the very outset, railway operating economies have primarily been the end product of moving heavier trains faster. This resulted from massing great and greater aggregate quantities of horsepower on each train. That has been the route of railway progress in the past. The achievements in locomotive development from 1829 through this present day do not exhaust the possibilities of the improvement of the "iron horse" but instead lay a broad foundation for its assuredly rapid and continued improvement.

Super-power and super-railroads will provide the formula for permanent success!



Construction view of Adam viaduct, showing transverse tie rods being inserted through the newly-installed prestressed, precast concrete beams

London, Midland & Scottish builds structure incorporating such units to determine their relative advantages in service—Methods of manufacture are described in detail

By R. L. M'ILMOYLE

Assistant Engineer of Structures,  
London, Midland & Scottish,  
London, England

## Prestressed Concrete Bridge Beams Being Tested in England

ON the London, Midland & Scottish it is recognized that precast, prestressed reinforced concrete beams have a number of theoretical advantages when used in bridge construction under certain conditions. To determine whether these advantages are borne out in actual practice beams of this design have been incorporated in a bridge that was recently reconstructed and which is now under observation. Before describing the design and method of construction it may be well to relate in some detail the considerations leading to the decision to conduct the experiment.

When the first British railways were built there was already a well-developed system of main and secondary highways. The acts of Parliament that authorized construction of the various lines required that public roads should be carried under or over the rails, and grade crossings avoided wherever possible. As a result, while there are relatively few large bridges on the British rail-

ways, the average number of bridges per mile of track is much greater than on American railroads. Thus the London, Midland & Scottish, with 6,800 route miles (19,200 track miles) has just over 27,000 bridges, or an average of 4 per mile. On the other hand there are only slightly more than 1,100 grade crossings, or an average of one every six miles.

Because the density of traffic is high

it is generally only possible for maintenance and construction forces to get possession of the tracks for short periods, usually at week-ends. As a result, the upkeep and renewal of these bridges present a considerable problem. Further, it is seldom possible to alter the alignment and construct a new bridge on a site alongside the existing one, although in some cases the new superstructure is constructed on temporary work alongside the existing bridge and rolled into position in one short possession.

In the case of underbridges\* the problem of renewal is further complicated by the fact that clearances are fixed by statute and the available constructional depth often imposes severe limitations on the design. Occasionally this can be increased by lifting the track, but frequently such a lift is restricted

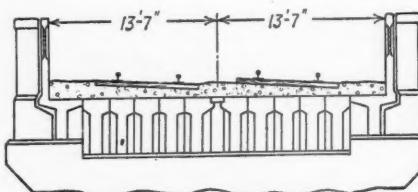


Fig. 1—Cross section of bridge deck, showing typical construction with precast units of the T-beam type

\* In Great Britain bridges carrying the tracks over public roads, rights of way, rivers, other railways, etc., are classified as underbridges.

by the existence of overbridges\*\* in close proximity to the underbridge.

For over a decade the L.M.S. has, wherever possible, carried out bridge reconstructions in precast reinforced concrete. This practice was adopted following more than a quarter of a century of satisfactory experience with this type of construction on the Northern Counties Committee, a subsidiary of the L.M.S., in Northern Ireland. Its advantages can be summarized as follows:

**Reduced maintenance**—The climate of Great Britain is severe on steel; painting generally must be carried out at least every six years, and in some cases every two years. In spite of this, corrosion is often heavy and repairs are frequent. Reinforced concrete, properly made, has been found to require little or no attention.

**Ease of manufacture and erection**—The units are manufactured in the company's own depot under shop conditions, and production can be carried on throughout the year. The units can be easily placed with minimum delays to traffic, as little or no speed restriction is necessary after erection.

**Continuous roadbed**—A ballasted deck, with the advantages afforded by continuity of the standard track construction, is easily provided. Ballasted timber decks have a short life in Great Britain and are now inadmissible on the L.M.S. The greater mass of the concrete units gives a smaller period of vibration and, consequently, a less lively track over the bridge.

**Reduced cost**—In most cases the precast concrete bridge is cheaper in first cost than the steel bridge and is decidedly cheaper in annual cost.

The only serious disadvantage of precast concrete units is that they generally require a greater constructional depth than steel.

\*\* Bridges carrying public roads, rights of way, other railways, etc., over a railway are classified as overbridges.

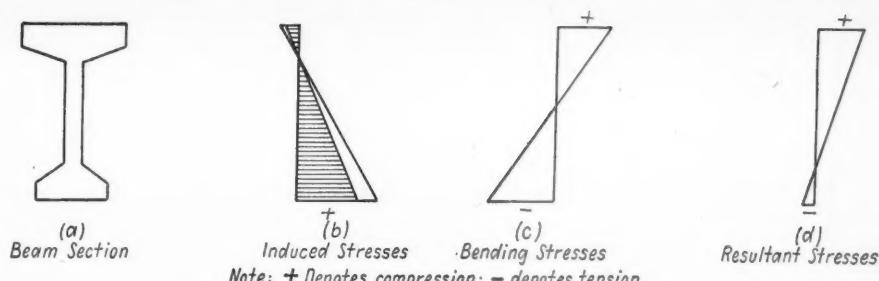


Fig. 2—These sketches illustrate the principle involved when the reinforcing in a concrete beam is prestressed

When first introduced the precast units were designed as slabs—generally one or two per track. These were used for relatively short spans, as the crane power available was not able to handle loads of more than 10 tons.

About 1924 the T-beam type, in which the deck consists of four or five independent T-beams placed side by side, was introduced, and when cranes of greater capacity became available about 1934 it was possible to renew spans up to 40 ft. in length with such units. A typical cross section of one of these spans is shown in Fig. 1. While this design was economical and very successful the constructional depth required was considerable, with the result that, because sufficient space was not available, the beams could not be used in many cases.

### Prestressing Investigated

The use of prestressed, precast concrete had been investigated before the outbreak of war but was not pursued. Some prestressed, precast beams were manufactured early in the war for emergency use in road bridges by the Ministry of War Transport, and the experience gained suggested a further study of the use of this method for underbridges. A comparative design for a

particular bridge was made and showed that, while the T-beam design required a depth of 51 in., the prestressed beam would be 10 in. shallower, i.e., 41 in. deep. The weights of the beams for each 2 ft. of width were 18 tons (long) and 14 tons, respectively. The area of reinforcement required for the T-beam was 15.9 sq. in. for the 2-ft. width, compared with only 4 sq. in. (high tensile) for an equivalent width of prestressed beam. It was decided to construct an underbridge with precast, prestressed beams to determine if these theoretical advantages would be obtained in practice. For various reasons it was not possible to carry out the work until 1946 when the renewal of a timber bridge, known as Adam viaduct, was undertaken. This bridge carries two Class I tracks on the line between Manchester and Liverpool.

As a structural material concrete suffers from the great disadvantage that, though it is strong in compression, it can carry little tension. In normal reinforced concrete the tension stresses are carried entirely by the steel, no allowance being made for the tensile strength of the concrete, which is assumed to have cracked to the neutral axis. Thus, the concrete below the neutral axis makes no contribution to the strength of the beam in bending.

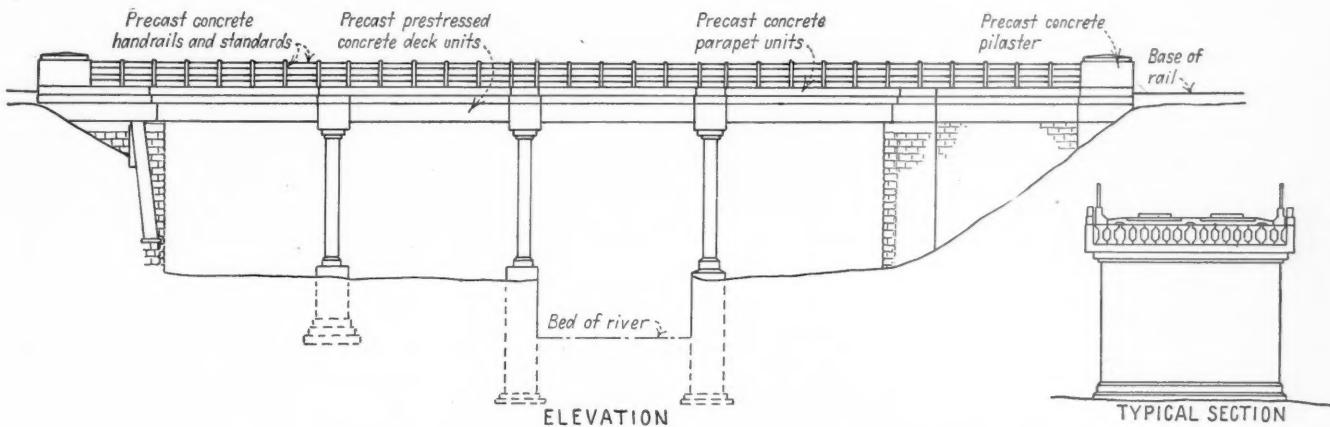


Fig. 3—Details of Adam viaduct as reconstructed using a design incorporating prestressed, precast concrete beams

This disadvantage can be overcome by inducing a compressive stress in the concrete sufficiently great to ensure that under full load the maximum value of

the tensile stress does not exceed the allowable tension in the concrete. There are two principal ways of inducing the prestress: (1) Applying a prestressing

force to the cured concrete (sometimes called poststressing); and (2) casting the concrete around steel already prestressed. The latter method was adopted. If the prestressed steel is efficiently anchored, the tendency of the steel to return to its original length will cause compression in the concrete.

In simple beams of the prestressed type the prestressing reinforcement is placed in the bottom flange; the eccentricity gives a maximum compressive stress in the bottom flange and generally induces a tension stress in the top flange. The whole of the induced prestress is not available for resisting the bending stress as a portion of it is released by elastic shortening of the beam, plastic yield, and shrinkage of the concrete.

#### Rebuilding Adam Viaduct

The stress distribution after prestressing is shown in Fig. 2(b). The net amount available after making allowance for the three factors referred to above is indicated by the cross-hatching on this figure. The stress caused by the dead and live loads is shown by Fig. 2(c) and the final stress condition is shown by Fig. 2(d). The small tension stress in the top flange has been converted into compression and the large compression stress in the bottom flange has become a small tension stress. The compressive stress induced by the prestressing also reduces the diagonal tension stress, so that in most cases shear reinforcement is unnecessary.

Details of Adam viaduct are shown in Fig. 3. This structure, carrying two tracks has four openings each 30 ft. long. In the original structure the abutments were masonry and the intermediate supports were timber bents supported on masonry foundations. The superstructure consisted of timber beams (braced from the bents and abutments) carrying a timber deck. In the reconstruction work the timber bents were replaced by concrete piers constructed on the old foundations, and the deck was formed of precast, prestressed I-section beams. The beams are 32 in. deep, the top flanges have a maximum width of  $20\frac{1}{2}$  in. and the bottom flanges are 16 in. wide. At the center of each beam the web is 4 in. thick, gradually increasing in thickness towards the ends from about the third points.

The small spaces between the top flanges of adjacent I-beams under each track are grouted, and three  $1\frac{1}{4}$ -in. high-tensile rods, placed transversely and stressed by means of nuts at each end, fix these members together so that they act as a single unit under live load. Two beams on each side of the deck support the parapet units. All beams were placed individually and the grouting and transverse stressing were carried out after erection.

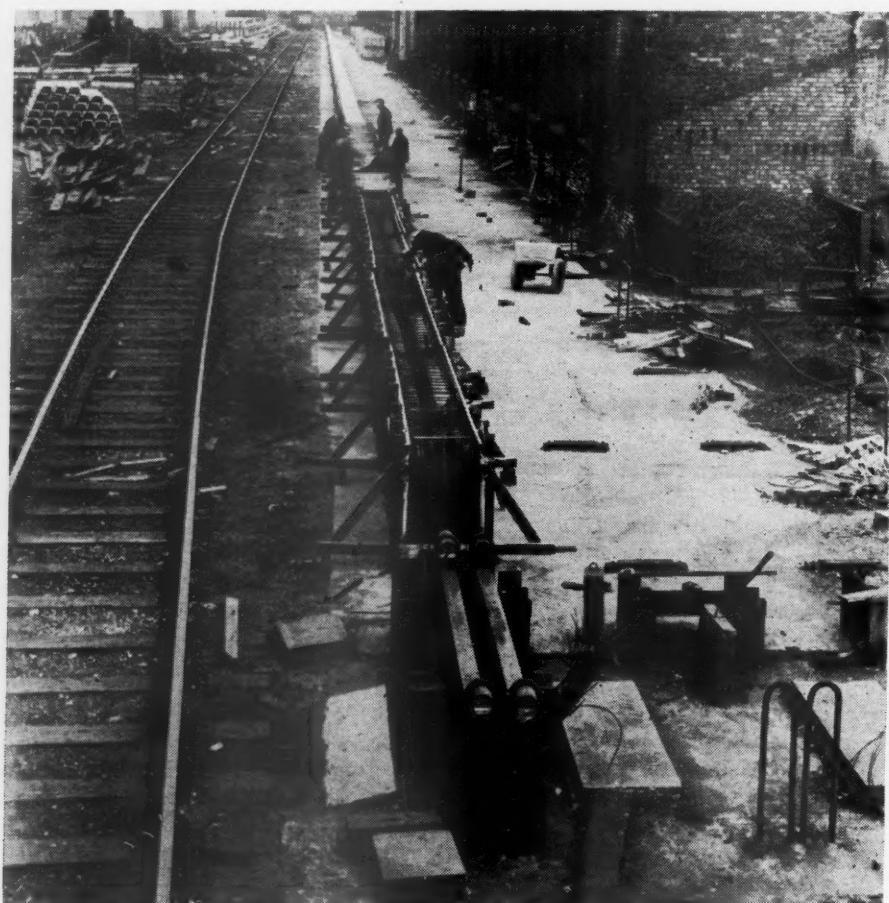


Fig. 4—Casting bed for the prestressed beams used in Adam viaduct, showing completed beams in background, forms being assembled in middle area, and anchorages for wires in the foreground.

Fig. 5—This view, which shows a length of the casting bed on which the beams have been completed, was taken before the pre-stress had been released. Note stored beams in the background.



Each beam is designed to carry 20 per cent of the total live load per track, which is taken as 20 units of the British Standard Loading for Railway Bridges (approximately E45) with an allowance for impact of 59 per cent, which was based on a report of the Bridge Stress Committee made in 1928. The pre-stressing reinforcement in each beam consists of 42 high-tensile wires, each  $\frac{1}{8}$  in. in diameter, placed in the bottom flange. This reinforcement is prestressed to 70 tons per sq. in. and 20 tons of this initial tension are considered as being absorbed by elastic shortening, plastic yield, etc., leaving 50 tons effective for carrying the load. This gives an effective prestress under no load of 1,350 lb. per sq. in. compression in the bottom flange and 290 lb. per sq. in. tension in the top flange. The application of the live and dead load gives a resultant bending stress of 190 lb. per sq. in. tension in the bottom flange and of 1,100 lb. per sq. in. compression in the top flange. The shear stress at the support is 260 lb. per sq. in. at the neutral axis, the compression component is 350 lb. per sq. in. and the tension component is 139 lb. per sq. in.

### Methods of Manufacture

The units were manufactured in the company's precast concrete depot at Manchester where a prestressed concrete casting bed had been laid down. This bed consists of two massive concrete abutments, approximately 900 ft. apart, with a concrete paved area between, on which the bottom forms for the units were leveled. The abutments were sufficiently wide to enable three rows of beams to be cast at one time.

The high-tensile wire was supplied in coils, each containing a length of wire slightly longer than the distance between the abutments. The wire was straightened, cleaned and stretched between the abutments, passing through spacing plates and an anchor plate at each abutment consisting of a heavy steel slab in which holes were drilled. Two wires were passed through each hole and then anchored in place by a tapered plug acting as a wedge. Care was taken to ensure that all wires would have the same initial tension. When these had been fixed and secured the anchor plates were jacked against the abutments until the total prestressing force had been induced in the steel. The prestressing force was measured by a calibrated gage on the jack and checked by the amount of travel of the anchor plates.

The anchor plates were then firmly fixed in position by wedging from the abutments. The stirrups or binders were placed round the stretched wires, and the side and end forms placed in position, with small gaps between the beams.

The concrete was then placed and when this had reached the desired strength (6,000 lb. per sq. in. at 28 days) the prestress was induced by gradually releasing the anchor plates. The shortening of the wires that then took place was sufficiently powerful to move the completed units on their base. The short lengths of wires between the units were then cut with an oxy-acetylene torch and the units lifted to storage. The process was then repeated until the desired number of beams had been manufactured.

Fig. 4 is a view looking along the casting bed from one of the anchorages. Only the last few beams in this set-up

were of ordinary mild steel. The concrete mix was designed to have a minimum crushing strength on 6-in. cubes of 6,000 lb. per sq. in. at 28 days or 4,000 lb. per sq. in. in 7 days using a high-early-strength cement. There was no difficulty in obtaining this strength. The mix used was approximately 1:3½ (30 per cent sand), and the water-cement ratio was about 0.45. The concrete was vibrated into position with external vibrators, as internal-type vibrators were not available at the time of manufacture. The tension wires were released after the last unit cast had attained the specified strength.

Loading tests were carried out on



Fig. 6—Underside of Adam viaduct following its reconstruction with prestressed, precast concrete beams

remain to be completed. The forms have been fixed in place and are being lined preparatory to concreting. The projecting steel sections in the foreground take the jack reaction during the prestressing and the anchor plate, with projecting lengths of wire, is clearly seen.

Fig. 5, showing a length of the casting bed on which the beams have been completed, was taken before the prestress had been released. The method of casting the beams in a continuous length is clearly shown, and a number of beams which have already been precast are seen stacked in the background.

The high-tensile wire used is hard-drawn, 0.2 in. in diameter, made of a specially-improved patent steel with a guaranteed breaking strength of 100 tons per sq. in. (224,000 lb. per sq. in.). Although the wire was specified to be degreased and free from soap or water, it was carefully cleaned by a wire brush during straightening to insure that there would be no difficulty in obtaining adequate bond.

Secondary reinforcement and stirrups

two of the beams by supporting them at the ends and applying a point load at the center by means of a jack reacting against a temporary load. This test load was equivalent to the designed load plus 50 per cent, which required the application of a point load of 26½ tons (long). The maximum deflection recorded in the case of one beam was  $\frac{1}{2}$  in. and in the other,  $\frac{1}{16}$  in. In both cases there was no permanent deflection and the beams returned to their original "hogged" condition after removal of the test load. There was no sign of cracking during the test. The beams were stored at the depot and dispatched to the site as required by the erection operations.

### Placing the Beams

The operating department was unable to agree to any track possessions other than at week-ends, and it was ultimately decided that the erection of the bridge should be carried out by removing the existing structure and replacing the piers with military-type steel bents and

the deck with temporary steel girders carried by these bents. By this method it was possible to construct the new piers during the week without interfering with traffic over the bridge. When the piers had been completed a portion of the temporary deck was removed and replaced with the new beams during week-end possessions.

The original schedule provided for the placing of the new deck in four separate operations, the units in two spans on one track to be dealt with in each operation. The first two operations were carried out as scheduled but the experience gained indicated that it would be possible to carry out the remaining two operations in one occupation. This was arranged and was easily carried out in the allowed time. Since the only cranes available were very slow in operation, the average time for lifting a beam and placing it in position was about ten minutes, but with a fast-acting crane this time could be substantially reduced.

When the beams under a track in any particular span had been put in place

the transverse tie rods were inserted in the holes provided in the top flanges and, after the grout had been placed between the units, the rods were stressed by operation of the nuts, using a calibrated tension spanner. The ballast was then placed and the new track laid.

While the units were manufactured in the company's depot the actual erection work was carried out under contract, the temporary trestles and deck being provided by the company and installed by the contractor.

As mentioned earlier, Adam viaduct was reconstructed in this way as an experiment to determine whether the use of prestressed concrete offered any advantages for the reconstruction of underbridges. It should be pointed out, however, that an essential aspect of the prestressing is the use of a high-strength concrete (6,000 lb. per sq. in.), whereas the concrete used for the normal type of precast underbridge has a compressive strength of only 3,000 lb. per sq. in. If the higher quality concrete were used for ordinary precast work the depth required for the T-beams in the compara-

tive case referred to earlier could be reduced from 51 in. to 46 in. and, if a small quantity of compression steel were added, the depth could be reduced to that of the prestressed beam, i. e., 41 in.

A careful analysis is now being made of the costs of both methods to determine whether or not it is economical to employ prestressed concrete as against the normal type of reinforced concrete using higher grade concrete with suitable increase in the working stress. Pending the results of this investigation, it is felt, however, that there is a considerable field for the use of prestressed concrete for work of this type. Investigations are now proceeding on the possibility of utilizing it for production of slabs required for smaller bridges of which there are a considerable number with small available constructional depth.

The last units were placed in Adam viaduct at the end of May, 1946, and so far there has been no sign of distress or defects in the structure, although the elapsed time has been too short to permit any conclusions to be drawn regarding their behavior under traffic.

## I. C. C. Bureau Says Wage Boost Will Cost \$454 Million

**Estimate, \$13.4 million under railroad figure, made in latest "Monthly Comment," which also indicates revenue results of class-rate adjustment and summarizes latest reports on prospective 1947 capital expenditures**

THE recent arbitration award of a 15½ cents per hour wage increase to non-operating employees will bring about an annual increase of \$454 million in railroad costs, according to the latest issue of the "Monthly Comment" published by the Bureau of Transport Economics and Statistics of the Interstate Commerce Commission. That estimate is \$13.4 million less than the figure of \$467.4 million which the railroads used in their supplemental petition in the Ex Parte 166 rate-increase case.

Both estimates include the additional payroll taxes to be incurred and allowances for increases which experience has indicated must also be given to related classes of employees. As to employment, the railroad figure was based on the 1946 level, whereas the bureau used a 1947 base, assuming the same level of employment in the last half of this year as in the first six months.

The wage advance became effective September 1, and the bureau also estimated that it will raise costs for this year's last four months by approximately \$151 million, including \$11 million of increased payroll taxes. Other calculations show how the increase brings the average straight-time hourly rate of the non-ops up to \$1.181, or 86.3 per cent above the 1939 rate of 63.4 cents. Prior to the increase the hourly rate was \$1.026, or 61.8 per cent above 1939.

The bureau also sets out its estimates as to the revenue effect of the interim class-rate adjustment ordered by the commission in the No. 28300 proceeding and finally made effective August 22. These estimates, based on 1946 traffic, show that the adjustment will reduce freight revenues for the country as a whole by \$1.4 million, which is equivalent to 0.23 per cent of total revenues from class rates and 0.02 per cent of

gross freight revenues. The estimated net decrease results from estimated reductions in revenues from class traffic moving within Southern and Western territories, and interterritorially, which more than offset the estimated increase of \$22.6 million in Official territory.

The estimates are shown in the table.

Estimated change in class rate revenue (millions of \$)	Estimated per cent change in	
	Class rate revenue	Total freight revenue
United States . . . . -\$1.4	- 0.23	- 0.02
<i>Intraterritorial</i>		
Official . . . . . +22.6	+ 7.8	+ 0.9
Southern . . . . . - 2.7	- 8.1	- 0.6
West . . . . . - 5.6	- 3.9	- 0.3
<i>Interterritorial</i>		
Official to southern . . . . . - 4.1	- 10.0	- 1.8
Southern to official . . . . . - 1.3	- 10.0	- 0.4
Official to west . . . . . - 5.9	- 9.5	- 1.3
West to official . . . . . - 2.8	- 9.7	- 0.6
Southern to west . . . . . - 1.0	- 6.6	- 0.3
West to southern . . . . . - 0.6	- 4.9	- 0.5

The No. 28300 interim order required a general increase of 10 per cent in class rates applicable within Official territory and a general decrease of 10 per cent in class rates applicable within and between Southern, Western Trunk Line and Southwestern territories, and between those territories on the one hand and Official territory on the other. The order was issued May 15, 1945, but appeals to the courts delayed establishment of the interim adjustment until last month. As noted in the *Railway Age* of July 12, page 89, the commission

ordered it established at that time in a report which set forth the plan for harmonizing it with the general Ex Parte 162 freight-rate increase which had meanwhile become effective.

## \$952 Million for Improvements

Bringing up to date its estimates of 1947 gross capital expenditures by Class I line-haul roads, the bureau now reports that such expenditures will total \$952 million, an increase 73.1 per cent above actual 1946 expenditures of \$550 million. The 1947 figure is based on reports of actual expenditures for the first half, plus estimates furnished to the bureau for the last two quarters. It includes \$666 million for equipment and \$286 million for roadway structures. The comparable 1946 figures were \$319 million and \$231 million, respectively.

Actual expenditures for 1947's first half are shown as \$232 million for equipment and \$119 million for road. Thus the estimates indicate that there remained to be spent in the second half about \$434 million for equipment and \$167 million for road. Moreover, the bureau said that the 1947 total "does not include figures for several roads which failed to supply estimates for the third and fourth quarters."

Freight train performance figures for the first six months of this year are compared by the bureau with those of the first halves of 1946 and 1941. The comparison, as the "Comment" puts it, shows the "marked improvement" in averages such as those reflecting cars per train, net tons and gross tons per train, net ton-miles per freight car day, load per car and gross ton-miles per train hour. Singled out for special comment is the "significant" average of net ton-miles per freight car day—975 in the 1947 period, up 17.4 per cent from 1946's 830 and 44.2 per cent from 1941's 676.

The 16 m.p.h. average speed of freight trains in 1947 was slightly less than the 1946 and 1941 speeds, but the bureau points out that the average train load was "much heavier" in this year's first half, when the net ton-miles per train-mile averaged 1,130 as compared with respective 1946 and 1941 figures of 1,047 and 952. It was also found of interest to note that the average gross weight of locomotives and tenders in freight service increased from 261 tons in 1941 to 280 tons in 1947 or 7.3 per cent.

As to the showing of a "considerable increase" in the density of freight traffic as compared with last year, the bureau suggests that the comparison "is probably affected by the irregularities in the production of commodities in the 1946 first half owing to shortages of materials, labor difficulties and other

factors." Freight train miles per mile of road per day averaged 7.3 in the first half of this year as compared with 6.8 in 1946 and 6.7 in 1941; and, for net ton-miles per mile of road per day, the averages were 8,307, 7,156, and 6,362, respectively.

Data relating to the equipment situation as of June 30 show that the Class I roads then had on line 1,915,999 freight cars of which 1,835,943 were serviceable, the per cent unserviceable being 4.2 per cent. The latter is the same as the June 30, 1946, percentage, but the freight car supply was then larger, the number serviceable being 1,861,207. Meanwhile the total number of road freight locomotives was down from 22,025 to 21,451, and the number stored in serviceable condition dropped from 1,387 to 868. The June 30 percentage unserviceable was 16.5 as compared with 16.9 on the same date last year.

In the case of switchers, the per cent unserviceable was 9.6 as compared with 11.4 on June 30, 1946; but the total number of such locomotives was down from 13,752 to 13,354, while the number stored in serviceable condition dropped from 703 to 300. As to road passenger locomotives, the total was down from 6,829 to 6,309, the number stored in serviceable condition dropped from 365 to 321 and the per cent unserviceable was up from 15.5 to 15.8.

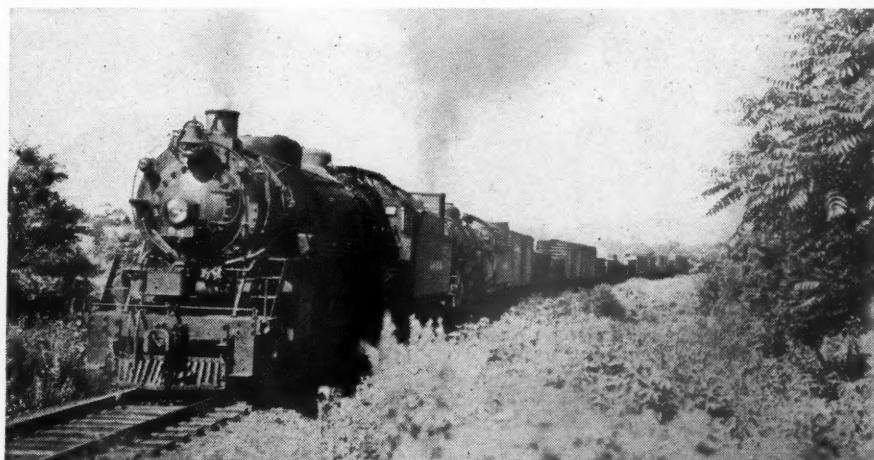
Freight commodity statistics were reported for the first time on the basis of the new classification (262 classes instead of the previous 157) in the first quarter of 1947, and the bureau takes a look at the results. It finds it interesting to note what happened to the n.o.s. (not otherwise specified) classes applicable to each of the five major commodity groups. In many cases new classes were created from the old "n.o.s." classes, while in other cases commodities were transferred to "more appropriate new classes."

The result is shown in the accompanying table which gives for the first quarters of 1947 and 1946 the percentages of the group tons terminated and freight revenue included in the respective group "n.o.s." classes. As the bureau interprets the figures, they "show clearly" that, as to the agriculture, mines, and manufactures and miscellaneous groups, the new classification "provides tonnage and revenue data for a very much greater number of specific and important commodities."

	Per cent of group total			
	Tons terminated		Freight revenue	
	1947	1946	1947	1946
Products of Agriculture, N.O.S.	2.7	8.4	1.7	6.0
Animals and Products, N.O.S.	9.7	10.8	4.7	7.3
Products of Mines, N.O.S.	1.5	5.9	2.2	5.5
Products of Forests, N.O.S.	3.4	3.4	2.5	3.1
Manufactures and Miscellaneous, N.O.S.	1.8	28.2	3.0	35.0

The bureau's usual analysis of latest revenue results shows that the July freight revenue on a daily basis was 6.2 per cent below June but 8.7 per cent above July, 1946. Passenger revenues were up 6.9 per cent from the previous month, but down 16.7 per cent as compared with July, 1946. The July freight revenue index (based on the 1935-39 monthly average as 100) was 207.8, compared with June's 221.5 and July, 1946's 191.2. The passenger revenue index was 267.4, compared with June's 250.1 and July, 1946's 320.9.

The net railway operating income for the 12 months ended with July was put at \$830,874,000 and the net income at \$519,212,000. These compare, respectively, with \$419,685,000 and \$48,773,000 for the 12 months ended with July, 1946, and with \$1,101,492,000 and \$693,286,000 for the 12 months ended with July, 1945.



Walter A. Lucas

A Lehigh & Hudson River double-header near Belvidere, N. J.



Officers of the Signal Section, Association of American Railroads, include (from left to right): L. B. Porter, chairman, superintendent of telegraph and signals, Chicago, Milwaukee, St. Paul & Pacific; J. A. Beddy, superintendent telegraph and signals, Norfolk & Western; and R. H. C. Balliet, secretary, Signal Section, Association of American Railroads

## Signal Section Discusses I. C. C. Order

**Three-day session at Chicago includes consideration of economics, new practices and means of increasing safety and saving train time**

THE use of modern signaling for facilitating train movements, and means for meeting the requirements of the June 17 order of the Interstate Commerce Commission, prescribing the signaling to be provided where high-speed trains are operated, were two of the more important topics of discussion at the forty-ninth annual meeting of the Signal Section of the Association of American Railroads, held at the Edgewater Beach Hotel, Chicago, September 11, 12 and 13. L. B. Porter, superintendent telegraph and signals of the Chicago, Milwaukee, St. Paul & Pacific, presided as chairman at this meeting, which was attended by 574 members and guests. In addition to the opening remarks by Chairman Porter, addresses were made by John W. Barriger, president of the Chicago, Indianapolis & Louisville; James H. Aydelott, vice-president, operations and maintenance department, A. A. R.; J. J. Brinkworth, vice president, New York Central and Martin H. Kennelly, mayor of Chicago. Technical papers explaining modern signaling developments were presented by C. S. Bushnell, chief engineer of the General Railway Signal Company and G. W. Baughman, chief engineer of the Union Switch & Signal Co.

The reports of nine of the twelve standing committees had to do with requisites, specifications, standard drawings, typical circuits and other technical details which are of interest primarily to signal engineers, and are not discussed here. Abstracts of three committee reports, dealing with the economics of signaling, signaling practice, and new uses of electronics are included in this article.

### Abstracts of Addresses

Mr. Brinkworth discussed signaling as a science and a profession of importance in the railroad field. He touched on several events in the history of signaling, especially the early installation of centralized traffic control on the Toledo & Ohio Central in 1927, in which he had a part as the division superintendent at that time. In discussing highway crossing protection, he endorsed the short-arm gates. He said that, in an analysis made recently, there were fewer accidents at crossings protected by short-arm gates in contrast to a surprising number at crossings protected by flashing-light signals only. The speaker also commented on the circumstances and hearings which led

up to the issuance of the Interstate Commerce Commission order on June 17, requiring extensive installations of signaling and additional protection such as cab signaling, train stop or train control. He expressed the belief that there was no use in challenging the commission for issuing the order. It was his thought that light traffic or few trains operated at more than specified maximum speed may be circumstances given consideration in its application.

In his address, Chairman Porter emphasized that the theme of the meeting was modern signaling as a means of increasing safety and saving train time. He also touched on the I. C. C. order of June 17, remarking that the interest of the railroads in cab signaling, train control or train stop, has been quite limited for a number of years, because the railroad managements have felt that greater returns could be secured for their money in increasing safety and efficiency through installations of the automatic block or similar systems which provide train operation by signal indication. Cab signals furnish information respecting the condition of the blocks, but engineers must still observe and be governed by the wayside signal indications and train orders.

In conclusion, Mr. Porter explained that, when planning new signaling such as centralized traffic control, consideration should be given to such matters as, for example, the elimination, respacing or lengthening of sidings; the retirement of seldom-used crossovers or switches; the conversion of double-track to single track where the volume of traffic does not justify the continued maintenance of the second track and where the new signaling system will afford the required flexibility and capacity.

#### Address by Jesse Clark

At the invitation of Chairman Porter, Jesse Clark, grand chairman of the Brotherhood of Railroad Signalmen of America, gave a brief address before the Signal Section meeting, which is abstracted as follows:

"I am pleased to bring you the greetings and good wishes of the brotherhood I have the honor to represent. We feel we are a part of the signal department, and, in fact, a part of this section of the A. A. R. It is our constant aim and determination to assist in building a stronger and better signal department. While some individuals whom we represent may not at times demonstrate this fact, I assure you that that very small minority does not represent the principles of our organization.

"While preparing these remarks, I could not help but think how happy and how proud we should be to live in this great country of ours. In no other place in the whole world is the principle of democracy practiced or more fully demonstrated than here. Nowhere else in the world would a leader of labor be permitted even to be present at a convention of managers or representatives of the management.

"Realizing these facts, one cannot help but wonder what some people are thinking about when they join with subversive groups and others, knowing full well that these groups will take away from them the liberties we now enjoy. I fully realize that communism is making and has made inroads in the ranks of labor, and that communists have filtered into our unions. We are just as sure, however, that they will never gain control of strong progressive unions representing well educated and intelligent groups. For that and many other good reasons, I am proud to be the representative of the signal department employees. Both management and labor have a dual responsibility in providing and securing good wages and working conditions for the employees. Underpaid and underprivileged workers are an easy prey for 'commies' and foolish schemes.

"Certainly, we of labor have no fight with our 'bosses' or the owners of our great industry. On the contrary, we

should work together to see that the industry prospers, for, obviously, without a healthy and prosperous industry there is no market for labor. That is why I desire to emphasize that we have no fight with you; we want good railroads and well trained employees, and by having these we have nothing to fear.

"These are some of the reasons I have a warm spot in my heart for the Signal Section. Your work of training and execution makes my job easier, and helps to build a stronger and safer department. We owe the best we have to the traveling and shipping public, and I believe the work of your section tends to bring about the most efficient and the safest method of travel yet known. We want to assist in those endeavors.

"While we may not at all times agree on the methods of procedure or just how to accomplish these ends, I am certain that we are all traveling toward the same goal and, as the song goes, 'You go to your church and I go to mine, but let's walk along together'."

#### Aydelott on the Signal Order

"I hold no brief for any railroad which operates its trains in the higher speed brackets without having first met certain fundamental requirements," said A. A. R. Vice-President Aydelott. "There seems, however, to be a conclusion reached that to have safety in high-speed operations something superior in the manner of signals and equipment must be in use even though the records show that accidents, and very serious ones, continue to occur to trains so equipped. We cannot ignore the part which the track and bridge structures and the equipment play in making train operations safe at those speeds. Nevertheless, the money to install and maintain all of these facilities comes from the same source, and that portion of the railroad dollar which is left after meeting payrolls, material and tax costs, simply isn't large enough to permit most railroads taking on additional expenditures for these refinements; and it is a matter of record also that some high-speed trains are operated on lines of very light traffic density. To put more than a proper share of our available funds into signaling, and particularly into the most costly of signaling, there will be less for necessary maintenance and for the construction of facilities of other character which must be provided if earnings are to be sustained and service to the public improved.

"It is not surprising that we do not see eye to eye with regulatory bodies which lay so much stress on high speed as the chief contributing factor to accident frequency. Experienced railroad officers will not agree with this conclusion, and their views are supported by

the record. Everyday maintenance of track and bridges brings the necessity for the reduction of train speeds, frequently to as low as 5 and 10 m.p.h., and there are numerous permanent slow orders to be observed. Of course, if the engineer fails to bring his train down to the required speed or if maintenance forces fail to designate properly the slow track as to exact location, the setting for an accident is present. These are occurrences daily to be guarded against and require the constant supervision of the officer staff.

"Many experienced railroad officers feel that when automatic or semi-automatic appliances are provided to perform functions that previously were entirely manual, or when other so-called "double checks" are established by rule, the alertness of some individuals to the duties prescribed for them gradually diminishes until finally the point is reached where the proper and immediate response in an emergency is lacking. No amount of engineering can remove the human element from railroad operations and maintenance, as there are many functions which it must necessarily handle. Man failures figure heavily in our accident record, as in those of other transportation agencies.

"The railroads do not want subsidies, which, on the basis of treatment of other agencies of transport by the taxpayers, they could rightfully claim since this new expense for signaling is presumed to be created by public demand, as expressed through the commission, to promote safety to those using our trains. On the floor of Congress only a few weeks ago a member of that body decried the fact that the railroads were discriminated against in being required to finance this new signal program while the taxpayers' money was used in providing facilities to be used by air and highway transport to enhance safety to those using such agencies."

#### Remarks by Mr. Barriger

Mr. Barriger, in opening his address, stated that while signals and communications may now appear less spectacular to those outside of railway life, compared with rolling stock, track and trains, they are equally important; furthermore, as they become of increasing importance, they will attract interest equal to that shown in the other components of railroading. With this, he predicted signals and communications would become a major component of the operating department, a separate independent organization no longer a subdivision of the engineering and maintenance of way departments, and equally important in rank to the transportation, maintenance of way and equipment departments. Quotations from Mr. Barriger's address follow:

"The most significant developments, from the standpoint of present and future practice, to observe in the progress of signals and communications are the increasingly close integration of these and of interlocking plants into a coordinated system for keeping trains moving, as well as for protecting them against collisions. Signals and communications have permitted space intervals which could be maintained between all trains in substitution for time intervals between following trains which could vanish quickly. The development of each separate component finally provided the present completely coordinated modern system for the movement of trains by signal indication.

"Each step has promptly led to an important series of new developments. The original mechanical interlockers were limited to linear extremities within which a strong man could move the switches connected by the long pipes to the control levers which he had to throw. The scope of these was necessarily held within the range of 500 to 1,000 ft. on either side of the control tower. Their range in due course was extended by power operation of switches actuated by interlocked electric controls. It was subsequently lengthened by using electric relays as the interlocking devices instead of the conventional bed of mechanical bars and locks. Remote controlled switches followed to give further range to interlocking, and these in conjunction with all-relay interlocking permitted a single specially designed plant to be stretched out along a great length of track mileage in the form of a C.T.C. installation over which trains could operate safely by signal indication without any reference to watches, timetables and train orders.

### Watches and Train Orders

"Near future years will relegate these previous mainstays of train operation, i.e., watches, timetables and train orders, to secondary roads and branches. Through the decades of transportation progress, the continual goal has been to reduce dependence of train movement upon such variable and fallible things as watches, train orders and timetables, and to shift the control and direction of movement wholly to indications which are conveyed by signals. The transition to train operation by signal indication has made relatively substantial advances on double and multiple-track lines, but only a good beginning has been made toward this end on the single-track lines which require C.T.C. to achieve it. However, multiple-track lines still have one important deficiency before this status will be achieved.

"So long as trains, even in the same direction, must operate on the same track and run at varying speeds, the

faster following train must overtake or run around the slower train. This, however, should be done with the minimum of delay to the slower train being run around and with no delay to the faster one. It cannot be achieved with any complete degree of success by reliance upon timetables or messages. It requires the perfect control and flexibility of train operation obtainable only by adequate signal and communication facilities to enable the slower train to move continuously to the most distant siding which it can reach without being overtaken by the following train that will run around it.

"All too many important double-track lines in the United States on which many fast passenger trains move between fleets of freight trains are not yet equipped to control completely the movement of trains to and from sidings by signal indication.

### Operation of Switches

"The corollary advantages of power-operated switches at the point at which the siding is entered will not avoid delays except in those instances where the superior train would otherwise overtake the inferior train before it cleared the main track. This is not said to question the desirability of installing power switches to the extent operating conditions warrant, but it is brought out merely to release the major benefits of complete train operation by signal indication from the cost handicap of power-thrown switches at entrances to sidings where these could not otherwise be justified.

"The basic objective is the signal control; the power switches are incidental. In leaving sidings, time can be saved through not having train crews manipulate hand-thrown switches, but since this movement is in the trailing-point direction, the spring switch is available as the answer.

"Railway lines vary through tremendous ranges of train densities and this factor is of controlling importance in the installation of modern communication and signal facilities. Often it is competitively necessary to obtain the protection and expedition of signal control on light-traffic lines as well as on the heavy-density ones. This provides another opportunity to test the abilities of the signal engineers. . . . The principal benefit of C.T.C. is derived less from the power operation of the switches for the inferior train entering the siding than by the dispatcher's perfect ability, with this facility, to select the meeting or passing point that will assuredly minimize time delays to both trains. Where train movements exceed 20 per day the economy of the power-throw switches in C.T.C. installations is unquestioned. . . .

"The Burlington in recent C.T.C. installations on the eastern portion of its Lincoln-Denver main line extended the interval between sidings with consequent decrease in cost but without any noticeable sacrifices of the advantages of the system. The spacing of sidings on C.T.C. territory is more directly influenced by running times of freight and passenger trains than by conventional ideas of past years of proper spacing of sidings which were originally established to meet the exigencies of low-speed operation unsupported by modern dispatching facilities. Increasing the intervals between sidings in C.T.C. territory will be a great factor to stimulate such installations.

### Why the Flagman

"Flagmen protect trains in automatic block territory less to guard against the contingency of a following train slightly overrunning block signals in stop position due to delayed observance of them than to guard against failure to observe stop signals altogether. The question that occurs to me whenever I see any train standing on a high-speed track, protected by a flagman, is to note whether, if an emergency arose, he could prevent a rear-end collision from the position he had taken.

"I cannot help but look on flagmen as being rapidly outmoded. If a flagman has an essential function in modern train operation it is to transform him into the train's intelligence and communication man. I believe that it will not be many years before the man who is now the flagman on important trains operating on busy railroads will become the equivalent of the radio operator on a ship, except that no technical competence will be required of him because it will no more be necessary for him to understand the operations of the apparatus he will use than for a person to be a telephone engineer in order to make a phone call. The flagman will, however, become the communications man of the train. He will maintain continuous touch with all other trains that in any way may affect the movement of the one to which he is assigned, and with dispatchers, interlocking tower operators and station agents."

### Economics of Signaling

Some of the reports presented by the Committee on Economics of Railway Signaling dealt with: (1) Costs involved in stopping trains; (2) power supply for signal systems; (3) economics of automatic block on the Central of Georgia; (4) increased operat-

ing efficiency and conversion from double track to single track on the Milwaukee; (5) economics of highway crossing protection; (6) methods of forecasting economic values of signaling; (7) economics of signaling for turnouts; (8) lengths of sidings for freight-train operation; (9) train-hour value; (10) yard track indicators; and (11) operating advantages of centralized traffic control.

*Economics and conversion from two main tracks to one when installing centralized traffic control*—This report explains a centralized traffic control project on 137 road miles on the Milwaukee between Glencoe, Minn., and Milbank, S. D. About 35.6 mi. of second main track were retired and, of this, about 7.1 mi. were converted to sidings. Three main-line crossovers were retired and nine main-line switches were converted to yard switches. The net annual saving in track maintenance is about \$35,134. The average traffic includes six passenger trains and about 14 or 15 freight trains daily.

Trains were formerly operated by timetable, train order, and manual block. There were objectionable delays under this system due to the blocks being of irregular length as most of the offices were only open on the day shift. This made it difficult to take care of meets and train-order requirements. The faults and shortcomings were felt most seriously during heavy seasonal movements of grain and stock. The discontinuance of the manual block system released seven telegraph operators for duty elsewhere and eliminated considerable overtime.

The use of centralized traffic control has given the dispatcher an automatic OS, which is the equivalent of a three-track office at all of the sidings as well as other points. Dispatchers know the location of every train, are able to figure the meets more closely and to take prompt advantage of changing conditions, with the result that meeting points are established by signal indication in such a manner as to reduce delays to a minimum. Closer supervision can be exercised by the dispatcher all along the line.

The elimination of train stops for the throwing of switches at the ends of the sidings also reduces the delays incidental to meeting and passing trains.

#### Annual Saving

Movement of trains	
2,741 train-hours at \$16.25	\$44,541
3,175 car-days at \$1.00	3,175
937 O/T hours at \$9.01	8,442
Train stops eliminated	
3,285 high-speed stops at \$2.25	7,391
26,280 low-speed stops at \$0.20	5,256
Manual block operation	
7 operators' positions	21,212
Overtime calls	4,665
Office expense (heat, light, stationery, etc.)	2,000
	\$96,682

#### Economic Statement

1. Cost of C. T. C. and track work	\$599,835
2. Gross saving per annum	\$131,816
3. Increased annual operating expenses	29,533
4. Net reduction in annual operating expenses	\$102,283
5. Deduction for interest charges at 3 per cent of \$599,835	17,995
6. Net saving per annum	\$ 84,288
7. Annual return over 3 per cent interest:	
On total cost (6 + 1)	14.1%

The shorter blocks also aid materially in improving train performance. A comparison of train movements in this territory for representative 30-day periods before and after the installation has developed a total of 2,741 freight-train hours saved per annum. Elimination of operators' positions and overtime calls has resulted in further savings. Estimated totals appear in an accompanying table.

*Economics of automatic, auto-manual, and manual-controlled electric highway crossing protection devices*—The Pennsylvania and the Southern installed manually controlled flashing-light signals at 13 street crossings in New Albany, Ind. Seven of these installations are controlled from one elevated tower and six from another. Previously, two crossings were protected by manually-operated gates for a period of 24 hr. each day, five crossings were protected by watchmen for 12 hr. a day, five crossings were protected by watchmen for 10 hr. a day and one crossing was unprotected. All 13 crossings are now protected 24 hr. daily.

#### Economic Statement

1. Cost of installation:	
(a) Capital investment	\$22,473
(b) Operating expenses	4,572
(c) Total	\$27,045
2. Gross saving per annum	\$40,668
3. Increased annual operating expenses	16,309
4. Net reduction in annual operating expenses	\$24,359
5. Deduction for interest charges at 6 per cent of \$27,045	1,623
6. Net saving per annum	\$22,736
7. Annual return over 6 per cent interest:	
(a) On capital investment (6 + 1-a)	101.17%
(b) On total cost (6 + 1-c)	84.07%

alternate for Rule 288, which is now yellow-over-red.

The report of the Committee on Electronics included explanations of several applications of this equipment in the signaling field. One new development is the use of a photo-electric tube to detect the presence of a car or other object on a switch, and thereby prevent the operation of a switch under a car in case the track relay is not shunted because of heavy sanding or rust on the rails.

The use of electronic devices and systems, such as radio for indicating the proximity of other trains, received considerable attention, and an abstract of the committee report on this subject follows:

The Bendix slow-tone warning unit is a warning device developed by the Bendix Aviation Corporation of Baltimore, Md. This unit operates in conjunction with railroad space radio communication equipment and in the event of an emergency stop or an accident, a member of the train crew throws a switch on the slow-tone unit. This activates the transmitter section of the communication set and an automatic warning signal is broadcast. Any radio-equipped train on the same frequency will receive this signal, provided it is within the effective area of the transmitter, which is from 4 to 10 mi. maximum. This warning tone could serve to inform the engineman of a slow speed or reduced speed condition as required by the rules. The automatic warning is broadcast in periodic pulses while the slow-tone switch is on the "on" position. This does not prevent normal operation of the communication circuit.

Radin, a joint development of Sperry Gyroscope Company and the Chicago, Rock Island & Pacific, is a direct distance measuring device which measures the air line distance between two radio equipped points. A signal originates at Point A, is received at the second Point B, and is re-transmitted on a second frequency back to Point A. Any audio tone placed on the original transmitter can be transmitted around this circle and the change in phase between the transmitted and the received signal gives the total distance that the radio wave has traveled. This figure, divided by two, supplies the actual distance the two points are apart.

Preliminary tests on the Chicago, Rock Island & Pacific show that this will work satisfactorily train to train over a distance of approximately 6 to 8 mi. under most conditions and 4 mi. under conditions where terrain is fairly level. This unit has not been tested in mountainous country. The receiving and transmitting equipment used is standard radio communication equipment; however, it must operate on a duplex basis.

## Signaling Practice and Electronics

The report of the Committee on Signaling Practice included recommendations for the acceptance of signal aspects, including flashing yellow lamps. For example, a single flashing-yellow is suggested as an alternate for the existing Code Rule 282A, yellow-over-yellow. A flashing-yellow under steady-red is suggested for Rule 286, which is now red-over-yellow-over-red, and a flashing yellow dwarf is recommended as an

# Interim Rate Case in Final Stage

**Oral argument on 10 per cent increase starts before I.C.C.; protestants testify advance at present time would result in recession, assert the carriers underestimate revenues**

PROCEEDINGS before the Interstate Commerce Commission on the railroads' request for an interim emergency increase of "not less than 10 per cent" in freight rates progressed according to schedule this week when the full commission convened on September 18 to hear oral argument on the motion for immediate relief. Meanwhile, as this issue went to press, no action had been taken by the commission with respect to the future program of hearings on the amended Ex Parte 166 petition wherein the railroads are seeking authority to make permanent increases averaging 27 per cent. As noted in *Railway Age* of September 13, page 73, the commission decided to consider the interim phase before proceeding with the so-called "general" case.

The carriers concluded their 5-day presentation on September 13, during which time numerous top-ranking railroad officers, including Dr. Julius H. Parmelee, vice-president of the Association of American Railroads and director of its Bureau of Railway Economics, and Walter S. Franklin, vice-president, traffic, of the Pennsylvania, stressed the railroads' need for additional revenues to offset higher operating costs due to the recent 15½ cents per hour wage increase for non-operating employees and higher prices for fuel and materials. The protestants ended their three-day presentation September 17. They included shippers' representatives, the Department of Agriculture and the National Association of Railroad and Utilities Commissioners.

Prior to the testimony of Mr. Franklin, Dr. Parmelee, whose presentation was outlined in the September 13 issue, denied under cross-examination that the railroads have underestimated their revenues for 1947. Stating that the estimates were prepared by the individual roads, Dr. Parmelee said that if the rates remain unchanged for the final four months of 1947, the carriers will realize "little or no" net income.

## Need Is Nationwide

According to Dr. Parmelee, the need for an increase in rates is nationwide, but greater in the Eastern district, where, he said, the roads handle more passenger traffic in comparison with freight than do roads in other territories.

He added in part that conditions in the Eastern district, where, he explained, passenger traffic is expected to decline further in 1948, were only a contributing factor in the overall situation.

Mr. Franklin, principal witness for the Eastern district carriers, in whose territory the rates would be increased by 38 per cent, told the commission that the Class I roads as a whole would have a net deficit of \$249,000,000 in 1948 at the present level of rates. At the same level, he continued, the Eastern roads' 1948 deficit would be \$204,000,000 and that of the Pennsylvania, \$95,000,000. He added that the P. R. R. would show a net deficit of \$15,676,000 for 1947 if the same rates remain effective.

"The railroads do not want a high freight rate structure," Mr. Franklin said, adding that the expectation of absorbing a substantial part of the higher operating costs had not been realized. Asserting that there has been too great a lag between increased costs and increased rates, Mr. Franklin said that the roads have been "too cautious" in proposing higher rates and relied too much on the possibility of accomplishing savings. "In this case," he testified, "the railroads have come somewhat nearer to asking for what the bill really is, although if the action of the commission on the entire case is not within at least 60 or 90 days, and immediately on what might be called the emergency wage portion of the case, the railroads will suffer a severe blow from which it will be exceedingly difficult to recover."

According to Mr. Franklin, approval of the amended petition, including the emergency 10 per cent advance, would give the P. R. R. a 1948 net income of \$59,771,000. The rate of return would be 4.73 per cent on net investment, as compared with the 6 per cent which the railroads assert they need. At the same time, he pointed out that the P. R. R.'s annual operating costs have increased \$331,000,000 since 1940, as compared with \$134,000,000 in annual additional revenues from increases in freight and express rates and passenger fares.

Remarking on Mr. Franklin's view that the increases sought by the railroads would still be "inadequate," Chairman Clyde B. Aitchison of the commission said that the railroads should present an "adequate" proposal and "let the people of the United States see what will be

needed to keep the railroads operating." Mr. Franklin's statement was based on the assumption that the operating brotherhoods will soon seek an increase in wages, thereby further increasing the carriers' operating costs. "If increases in operating costs continue," he said, "we'll be back here. But we don't want to be the ones to push up the costs."

Other railroad officers—including C. H. Buford, president of the Chicago, Milwaukee, St. Paul & Pacific; H. S. Palmer, president of the New York, New Haven & Hartford; R. B. White, president of the Baltimore & Ohio; R. L. Williams, president of the Chicago & North Western; W. A. Johnston, president of the Illinois Central; R. E. Woodruff, president of the Erie; W. S. Hackworth, president of the Nashville, Chattanooga & St. Louis; P. J. Neff, chief executive officer of the Missouri Pacific Lines; M. J. Wise, vice-president of the Central of Georgia; L. L. Knight, comptroller of the Seaboard Air Line; and R. J. Doss, vice-president, traffic, of the Atlantic Coast Line—followed Mr. Franklin to the witness stand in support of the railroads' plea. All presented testimony designed to show the effect of the wage award to the non-operating employees and increased costs of fuel and materials since the original petition in Ex Parte 166 was filed in July.

Among the aforementioned, Mr. Buford declared that the Milwaukee's net railway operating income in 1946 was only about one-half the 1929 figure, with the 1946 rate of return being 1.95 per cent, as compared with 4.09 per cent in 1929. A preview of Mr. Buford's testimony appeared in *Railway Age* of September 6, page 69, while that of the other railroad witnesses, based on the original petition in Ex Parte 166, appeared in the issue of August 30, page 49.

## Operating Costs Cut

Mr. Palmer, giving notice that the New Haven would soon seek a further increase in its coach passenger fares to approximately 3 cents per mile, testified that that road has cut its operating expenses by an estimated \$2,250,000 in 1947, and that as of September 1, it had 1,829 fewer employees on its payrolls than at the same time in 1946.

Pointing out that passenger service operations on the New Haven account for approximately 47 per cent of its total operating revenues, Mr. Palmer said that the January 1 increase in freight rates—the result of Ex Parte 162—brought an increase of about 10 per cent in the New Haven's total operating revenues.

According to Mr. White, the B. & O., on the basis of present rates and costs, will show a net deficit of \$17,384,000 and a net operating income of \$4,057,000 in 1948, which, he said, would produce a rate of return of 0.41 per cent. He testified that, on the basis of the proposed rate increases, the B. & O.'s 1948 income would be \$43,623,000, its net railway operating income \$65,064,000 and its rate of return 6.56 per cent.

Mr. Williams told the commission that agriculture has received "favorable and preferential" treatment in the matter of railroad rates since 1935 and is now in a position to pay its proper share of the nation's transportation bill. He also testified that iron ore is another commodity which has contributed less than other commodities generally to meet the transportation costs of the last decade. Adding that iron ore constitutes approximately 20 per cent of the C. & N. W.'s total tonnage, he maintained that "the revenue necessary to continue the North Western as a strong and solvent transportation agency . . . is not going to be forthcoming if any substantial segment of its traffic continues to move at rates antedating the war." "The only alternative," he said, "would be to pass this deficiency in revenue on to other commodities, not even excluding agricultural products."

### I. C., Erie Outlook

Mr. Johnston said that the I. C. will have a 1947 net railway operating income of \$17,000,000 and will show a deficit of \$1,300,000 in 1948 at the present rate level. Among other things, he also testified that the I. C. needs at least \$25,000,000 a year in net railway operating income and that its expenditures for supplies and materials have increased 5.6 per cent since June 30.

According to Mr. Woodruff, the Erie's annual operating expenses and payroll taxes have risen \$31,600,000 since 1941. He said that the Erie's 1941 payroll was \$46,328,320 for 22,481 employees, as compared with \$72,459,703 for 23,666 employees in 1946, while the cost of coal has increased from \$2.72 per ton in 1941 to \$4.19 per ton in 1946, or 54 per cent. He also testified that the Erie's 1946 rate of return was 2.09 per cent; increases in rates granted by the commission are insufficient to meet increased expenses since 1941 by \$10,063,000 per year; and the proposed 10

per cent interim increase plus the recently approved increase in commutation fares would still fall short by approximately \$615,000 of meeting increased costs in wages and supplies.

Asserting that the loss to water or motor carriers through higher freight rates will not be "great," Mr. Doss reminded the commission that the railroads "always reserve the right to modify their rates from time to time to meet competitive conditions." He added in part that the A. C. L., by spending \$2,500,000 less for maintenance of way and structures during the first six months of 1947, as compared with the same 1946 period, was able to show a net railway operating income of \$3,008,846. "If we had spent for maintenance of way and structures for the first six months of 1947 the same as was spent in the first six months of 1946," he continued, "the net railway operating income would have been reduced to only \$475,498." The A. C. L. officer also testified that the road plans to spend \$24,425,000 for additions to its rolling stock and \$18,588,000 for signal protection installation.

### Costly Signaling

Mr. Knight stated that, on the basis of present conditions, the Seaboard's net railway operating income for 1947 would be only 6.13 cents of each dollar of revenue, as compared with 16.75 cents for the five-year period ended December 31, 1930, and 14.12 cents for the 25-year period ended December 31, 1945. Predicting a "worse" situation in 1948, he added that the cost of new equipment delivered to the road since last January 1 or now on order totals \$17,300,000, while the cost of signal installations will amount to approximately \$20,000,000.

Messrs. Hackworth, Neff, and Wise also testified extensively in support of the railroads' request. The latter told the commission that the C. of Ga. in 1946 received 23 per cent less per ton-mile for handling freight traffic than it did in 1922, adding that "for the first five months of 1947, the revenue per ton-mile was 18 per cent less than received in 1922."

Mr. Neff said that the railroads "look to the commission" to give them rates to earn sufficient funds to "take care of their improvements at their own expense and pay taxes while doing it." Declaring that all trends are upward, except in the railroad industry, Mr. Neff said that if the M.P. had been allowed a return averaging at least 6 per cent on its investment from 1921 to 1930, it would have had a sufficient backlog of resources to have weathered the financial depression of the 30's and would "probably never have been in bankruptcy."

Among the protestants, Dr. L. H. Bean, economist for the Department of

Agriculture, told the commission that any advance in freight rates at the present time would act as a spur toward inflation and lead to an economic recession. He declared that the railroads should raise their rates "only when the economy permits" and "when prices are in balance with production and income."

Testifying specifically in opposition to any increase in agricultural products, Dr. Bean predicted that the movement of crops in 1947 would equal and perhaps exceed 1946, when, he said, the railroads handled a record volume of such traffic. The witness asserted that the potential enlargement of the nation's export program also would result in more freight traffic and added revenues to the carriers.

Representing the state commissioners, R. V. Gilbert, Washington, D. C., economist, and former research director for the Office of Price Administration, declared that, because the railroads are better off financially today than in 1939, there is no need for an emergency increase in freight rates. He supported this and numerous other contentions with a detailed statistical exhibit based on data obtained from A. A. R. and I. C. C. statements, comparative records of railroad earnings, operating costs and "trends," personal assumptions based on prospective railroad traffic and on evidence presented earlier and in other rate proceedings by railroad officers.

### Sees Record Loadings

According to Mr. Gilbert, the downward trend in passenger traffic "practically ended" during the first six months of 1947, despite the prediction by railroad officers that there would be further declines in the latter half of 1947 and next year. At the same time, he predicted a record volume of freight traffic during the final six months of 1947, in spite of the shortage of freight cars. Elaborating on this statement, Mr. Gilbert, who described Dr. Parmelee's estimate of future expenses as being on the "high side," said he expects carloadings of freight to increase by a minimum of 5 per cent during the last half of 1947 over the first six months. "A 4 to 5 per cent increase in ton-miles in the last half of this year as compared with the similar period of last year is practically a certainty," he said.

Mr. Gilbert, who was subjected to extensive questioning by the commission, declared that the railroads "over-maintained" their systems in 1946, thus necessitating large expenditures, and that those railroads reporting heavy deficits might be better off in some cases to "rip up their tracks" rather than to continue at great losses. This assertion led Jacob Aronson, vice-president and general counsel of the New York Central, and

chief counsel for the petitioning roads, to remark that "you would rather kill the patient than to cure him."

"It is difficult to see how there would be any emergency confronting the railroads which would require relief so badly that it would make any difference if it were put off for three or four months to allow a thorough examination of the issues," Mr. Gilbert continued in part, adding that, as a whole, the railroads in 1944, 1945 and 1946 paid larger cash dividends than in any years since 1931.

The commission also devoted considerable time to the testimony of individual shippers, whose general contention was that, although the carriers are in need of additional revenue, a flat increase of 10 per cent would definitely disturb the freight rate structure and place many shippers at a competitive disadvantage. The shippers recommended, for the most part, that the commission, should it approve the interim increase, prescribe certain rate maxima on virtually every specific commodity. The commission also is in receipt of a large number of verified statements and petitions with respect to the proposed increase.

## NEW BOOK . . .

*Interstate Commerce and Traffic Law*, by G. Lloyd Wilson. 677 pages. 8 in. by 5½ in. Bound in cloth. Published by Prentice-Hall, Inc., 70 Fifth avenue, New York 11. Price \$7.35

This author, professor of transportation and public utilities at the Wharton School of the University of Pennsylvania, director of the division of rates of the Office of Defense Transportation during the war, and authoritative writer on rate and traffic subjects, needs no introduction to *Railway Age* readers, as many of his carefully documented and logically organized papers have appeared in these pages. The same clarity and coherence distinguish the book under review, as would be expected. In it Dr. Wilson has set forth the basic findings of the courts as to the rights and duties of carriers and shippers and users of transportation services under the Interstate Commerce Act and related administrative orders.

This book is developed from a collection of cases prepared by the author and published in 1944 by the Associated Traffic Clubs of America, in which form it was used as a text in university courses in traffic management and law and in the war training program of the federal Office of Education. It takes up each phase of traffic management, stating first the pertinent present provisions of the Interstate Commerce Act, then giving a selection of significant decisions and statements of opinion of the courts affecting the rights and duties of shippers and carriers thereunder, along with an analysis of the salient features of

each of these decisions. In this way appropriate opinions and facts covering the whole range of the act are collected within a single volume for easy reference and comparison. While repetitious matter in the cases has been reduced, great care has been taken to preserve the meaning of the language in preparing the digests.

The book takes up the basic law and relevant court decisions in the following order: Definition of interstate commerce; status and duties of a common carrier; freight car service; extension and abandonment of railroad facilities; railroad switch connections; embargoes; transit services and privileges; freight terminal services and demurrage; railroad terminal facilities; pooling of traffic and unification of facilities; the commodities clause; continuous

carriage of freight; relations between rail and water carriers; damages and penalties for Interstate Commerce Act violations; unreasonableness in rate making; rebates and special rates; discrimination in rates; discrimination between interstate and intrastate rates; undue prejudice and preference; fourth section rates; the rule of rate making and fair return; valuation and the rate base; free transportation and reduced rates; allowances by carriers; tariff publication and construction; establishment of routes and misrouting; divisions of joint rates between carriers; collection, payment and guarantee of freight charges; loss, damage and delay claims; claims for overcharge and undercharge; reparations; accounts and records of interstate carriers; and regulation of carriers' securities.

## Elliott Fisher Lettering Machine

An electric-powered mechanical means of lettering drawings, plans, charts and other forms prepared in engineering offices has been developed by the Underwood Corporation, New York. Known as the Elliott Fisher Electric Lettering machine, this device embodies a lettering head in the form of a carriage traveling on a supporting mechanism that, in turn, is mounted on two bars, transverse of the carriage. These bars serve also as a track for movement of

keyboard, with the key stroke electrically operated, and moves automatically on its guides for letter spacing. Line spacing is either automatic with the return of the lettering head or manual by means of a rifle-sight line indicator, which tells the operator at all times where the type will print. The writing area contains approximately 396 sq. in. of surface at one setting.

The advantages claimed for the lettering machine are as follows: Mechanical precision at typing speed; sharp and clear type impressions due to the electrically-controlled stroke; the flat writing surface which is visible to the



The electric lettering machine in operation

the machine at right angles to the operator. Directly beneath the bars is a flat platen or writing surface, 16½ by 24 in. in size, with a roll in front and one behind for holding the work. The entire machine is mounted on a stand similar to a desk.

The lettering head contains a standard

operator at all times; pin-point accuracy due to the specially designed line indicator; and the availability of characters to suit the needs of the user. Also, the standard arrangement of the keyboard is said to permit an office clerk to become a proficient operator quickly.

# GENERAL NEWS

## Johnson Again Raps "Rip Van Winkle" Ad

Says Young has offered "no usable suggestions" for relieving car shortage

Robert R. Young, chairman of the Chesapeake & Ohio, has made "no usable suggestions" for alleviation of current freight-car shortages, Director J. Monroe Johnson of the Office of Defense Transportation said last week in further comment on the C. & O.'s "Rip Van Winkle" advertisement. While he expressed full agreement with Mr. Young's present emphasis on the C. & O.'s principal role as a "coal road," the O. D. T. director at the same time took occasion to say that, "for the past year or two," Mr. Young "has been raving with suggestions for improved passenger service based on C. & O. methods." He added that "to consider the C. & O. a passenger road is humorous."

The "Rip Van Winkle" advertisement called for the elimination of railroad agreements on freight-service schedules as an aid in relieving the car shortage and Mr. Young's recent statements stressing the C. & O.'s character as a "coal road" have been in reply to those whose critical comment on the ad has included figures showing that average freight-train speeds on the C. & O. are lower than those of certain other roads. Like his previous comment, Colonel Johnson's further observations were made in replies to letters he has received about the ad.

**Replies to Letters**—The statements quoted above were made in a September 10 letter to Sylvan Cole, chairman of the board, National Shirt Shops, New York. The O. D. T. director also told Mr. Cole that "for anyone to think that for a few freight trains from the West coast to Chicago to slow their movement could affect the now stupendous freight car shortages brands that person as one totally unadvised in transportation matters."

In another recent letter, Dr. James E. Mills of Hartsville, S. C., Colonel Johnson said that the earlier C. & O. "hog" advertisement, like the 'Rip Van Winkle' ad, is more than impractical." He added: "No hog was ever shipped through Chicago without changing not only cars but trains. In fact, no livestock ever moved over 28 hours without being unloaded, watered, fed, and rested."

Seemingly, Dr. Mills had also corresponded with Mr. Young, for the O. D. T. director referred to such correspondence as having led the doctor to conclude that the Interstate Commerce Commission "is at fault." The commission "is a govern-

## Users Dodge Cost of New Maryland Highways

The very costly long-range program for widening, straightening and strengthening Maryland's highways can be proceeded with, now that that state's general sales tax is proving as remunerative as was hoped, according to reports from the state capital. Action on the road program had been held up until it could be demonstrated that the state's general budget could be balanced without including receipts from highway users that previously had been credited to it, and without charging it with highway patrol costs.

The governor's announcement of this added largesse to users of Maryland roads said in part:

"In the program for financing the plans for the reconstruction and rehabilitation of the road system in Maryland, I deemed it necessary to transfer the receipts of motor vehicles titling taxes in the estimated annual amount of \$3,000,000 from the general funds to the road funds and to transfer the expense of the state police in the amount of \$1,500,000 from road funds to general funds.

"This meant that the amount of money available for the construction of roads would be increased \$4,500,000 annually, but general funds would be decreased by the same amount. It was intended that a part of the receipts from the sales tax would replace this decrease in the general fund account and bring the budget into balance."

mental regulatory body and was not intended to be and is not a governmental agency to operate the railroads," Colonel Johnson explained. He went on to say that the C. & O. advertisements have caused the commission to receive many inquiries—"so numerous, in fact, that I have mimeographed copies of various letters written in connection with the 'Rip Van Winkle' ad." A copy of that file was sent along to Dr. Mills.

The letter to Mr. Cole indicates that he, too, received the file, but he came back to express his wonder "if someone is not missing the point" of the ad. Colonel Johnson assured him that the file "missed no point"; that "all the answers were there to one versed in transportation." The O. D. T. director went on to advise that he was not seeking correspondence on the subject; he was "answering inquiries only," while "wrestling with one of the most

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## Felton Says Steel Is Still Bottleneck

Freight car builders cannot approach goal with current supply

The nation's freight car building program will fall far short of its 10,000-cars-per-month goal unless car builders receive additional steel for new cars, S. M. Felton, president of the American Railway Car Institute, advised Col. J. Monroe Johnson, director of the Office of Defense Transportation, in Washington, D. C., on September 11. A survey just completed covering seven months' steel receipts by 19 plants building freight cars, Mr. Felton said, shows plainly that it is impossible for the car builders and railroad shops to meet the goal agreed upon by government and private agencies with current steel receipts. The survey, made by the institute, was conducted to ascertain the exact tonnage of steel for new car building actually received monthly by car builders and their steel inventory position at the end of each month.

Confusion regarding the amount of steel received for new cars has arisen from the fact that steel allocations reported by the steel industry include steel for maintenance, repair and other purposes as well as for new cars, Mr. Felton explained. He summarized facts revealed by the survey as follows:

"At no time during recent months has the supply of steel for new domestic freight cars been adequate even for the 7,000-cars-a-month program planned in a February Washington conference attended by steel, railroad, car builder and government representatives. Under this program, rolling of steel for freight cars was to have been increased to a 10,000-car level, or 40 per cent, in July. Instead, July receipts of steel for new cars by the car builders showed a decrease of 20 per cent as compared with June and were about 10 per cent below receipts in April and May. To achieve and maintain a pace of 10,000 cars a month, delivered by car builders and by railroad shops, obviously it is necessary to build up steel inventory sharply, and in balanced car sets. Otherwise, stoppages would wreck the proposed program.

"The backlog of steel supplies should be at least doubled. In sharp contrast with that need, the car builders' inventories of steel for new cars increased only about 20 per cent, April through June, and showed a decline at the end of July—the month during which a sharp step-up of supply

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## Won't Control N.Y.C. as Director—Young

Says he would not seek to exercise control without I. C. C. approval

Testifying this week at Interstate Commerce Commission hearings on his application for authority to serve on the New York Central's board of directors, Robert R. Young, chairman of the Chesapeake & Ohio, denied that such a position would give him "control" of the Central or that he would attempt to exercise "control" without specific approval of the commission. Mr. Young's testimony, which covered a wide range of subjects, included his condemnation of what he has observed to be the reliance of the railroad industry generally on the pending Bulwinkle bill as a cure for its anti-trust troubles. He said he had been "told by the President that he would probably veto that bill if it ever got to him."

The C. & O. chairman's denial that favorable commission action on his present application would give him "control" of the Central came when counsel for opposing parties confronted him, on cross-examination, with newspaper reports of interviews wherein he was quoted as having said that his election to the Central board would result in his "control" of that road. Mr. Young said that the newspaper stories contained an "error," which, he added, was "not serious," for it merely amounted to a failure to report "all the refinements" of his statements. He explained that he had said in such instances that his interest in N. Y. C. would lead the way to control by the "stockholders" instead of the "bankers."

**A "Refined" Distinction**—Later on, Mr. Young made a similar reply when he was asked about other recent newspaper stories which had quoted him as having said that he would resign from his C. & O. positions and thus remove his bid for the N. Y. C. directorship from I. C. C. jurisdiction if the commission's decision on the present application were adverse. There again, he said, a "refinement had been missed" by the reporters. He explained that he hadn't said he "would" resign—he had said he "could." And he now says he "can" and "may," but he doesn't say he "will." The C. & O. chairman went on to say that the reporters' "errors" were not serious in this instance either. He added, however, that such things are "more delicate" when it comes to public hearings before the commission where one must be "more careful."

The hearings, at Washington, D. C., are before Assistant Director C. E. Boles of the commission's Bureau of Finance, who recently made a proposed report recommending that the commission deny an unopposed application of the Wabash's president, Arthur K. Atkinson, for authority to serve also as a director of the Lehigh Valley, in both of which the Pennsylvania and affiliated companies have substantial interests. In addition to Mr. Young's application, the proceedings also

involve a like application of C. & O. President Robert J. Bowman, and the petition of C. & O. and Alleghany Corporation for release of the former's 400,000 shares of N. Y. C. stock from the requirement whereby it has been deposited with the Chase National Bank as independent voting trustee under the trusteeship created pursuant to the commission's June, 1945, decision approving Alleghany's control of the C. & O., New York, Chicago & St. Louis and Pere Marquette.

**To Distribute N. K. P. Stock**—The Pere Marquette was recently merged into the C. & O., which this week announced that its plan to divest itself of Nickel Plate stock would be consummated on November 10 when such holdings would be distributed to C. & O. stockholders as a dividend. The announcement, made in Washington while the hearings on the Central directorships were in progress, followed the commission's recent decision dismissing, for lack of jurisdiction, a C. & O. application for authority to make the distribution. In view of this divestment, the C. & O.-Alleghany petition in the present proceedings has been amended to eliminate the proposal that the Nickel Plate stock, instead of the N. Y. C. shares, be deposited with the trustee.

Other witnesses favoring the applications and petition preceded Mr. Young on the witness stand. They were Mr. Bowman, and other C. & O. officers as follows: Ross S. Marshall, senior vice-president; William H. Wenneman, vice-president—finance and corporate relations; and Carlton W. Meyer, assistant to the president. Also, William N. Leonard, associate professor of economics, Rutgers University; Julius Grodinsky, associate professor of finance, University of Pennsylvania, and Governor Clarence W. Meadows of West Virginia, who said he was appearing of his own volition. J. C. Kauffman, C. & O. general counsel, was in general charge of the presentation; but counsel for the petitioners included former Senator Burton K. Wheeler of Montana.

Generally these proponents looked to ultimate consolidation of the C. & O. and N. Y. C., stressing the "complementary" nature of the two systems and arguing that the benefits of union would greatly outweigh any adverse effects of lessened competition at the relatively few points where competition now exists. This testimony as to the benefits of ultimate consolidation was objected to by protestants, and Assistant Director Boles agreed that it was not relevant to the present proceedings. Nevertheless, he let it go into the record, noting that it was intermingled with other testimony bearing on benefits expected to accrue to C. & O. and N. Y. C. in the nearer future as a result of the election of Messrs. Young and Bowman to the latter's board.

**Opposition's Views**—Protestants included the Virginian, various communities in Virginia and some in West Virginia, a group of Nickel Plate preferred stockholders, and the Chrysler Corporation and Packard Motor Car Company. Another intervener was the Detroit (Mich.) Board of Commerce which announced that it would not oppose the applications in view of assurances that all existing routes would

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## Trend of Rail Wages Analyzed by Monroe

Comparisons with other industries also shown by assistant director of B.R.E.

Comparative trends of wages on the railroads and in other industries are analyzed by J. Elmer Monroe, assistant director of the Bureau of Railway Economics, Association of American Railroads, in a recently-published pamphlet entitled "Railroad Men and Wages." Because of his work with carrier conference committees in general wage cases, Mr. Monroe, as the prefatory note says, has "devoted many years to the compilation and analysis of data relating to employment, rates of pay, and employee earnings."

The note goes on to describe the pamphlet as one which "summarizes a number of facts which are presented in condensed form for handy reference." It is a volume of 155 pages, illustrated with several charts and containing many statistical tabulations, which do not, however, cover the recent arbitration award of 15½ cents per hour to non-operating employees. Generally, Mr. Monroe lets the figures speak for themselves, his comments being designed to point up what they show and to guide the reader's interpretation of the showing.

**Unions Limit Days Worked**—Opening chapters explain briefly how railroad employees are organized for collective bargaining and how they are paid. In the latter connection, there is a highlight description of the train service employees' dual basis of pay. There Mr. Monroe points out that the enginemen's scale is graded according to weight on drivers of locomotives, and thus those employees "stand to benefit in increased pay as the railroads put in service heavier and more powerful locomotives." He also notes that the monthly mileage limitation, imposed by the unions to spread the available work, "artificially limits the earning opportunities" of the men in train and engine service.

Coming to his consideration of employee compensation, Mr. Monroe sets up a tabulation showing that the straight-time rate of pay of all railroad employees averaged 113.9 cents per hour during the first quarter of 1947. The average hourly earnings (straight time and overtime) during the same period is shown at 121.7 cents, while the weekly earnings averaged \$60.18 per employee. The average compensation for the year 1946 was \$3,069.

Excluding the "executives, officials, and staff assistants" group, this year's first-quarter figure for the average straight-time hourly rate becomes 111.9 cents; the average hourly earnings were 119.8 cents; and the average weekly earnings \$59.30. The latter was 81.5 per cent greater than the comparable figure for the first quarter of 1929, 68.1 per cent greater than 1939, and 15.3 per cent greater than 1944.

It is Mr. Monroe's contention that the

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## Debit Roads Seek Arbitration for Express Dispute

It is understood that a number of railroads, the express revenues of which would be debited under a plan to readjust the division of express revenues retroactively for a seven-year period ended March 31, 1947, agreed at St. Louis, Mo., on September 11, to ask to have their protest to the plan submitted to arbitration. The dispute between so-called "debit" and "credit" roads arises from a recommendation by Carrier Committee D (accounting) of owning roads of the Railway Express Agency that a retroactive adjustment be made for the period—when express business increased enormously due to the war—with a view to equalizing individual service performance with revenue fluctuations. In short, roads would be debited to the extent that their performance of service—measured in car-foot-miles—fell below the fluctuations in revenues and, conversely, roads performing relatively greater service in proportion to revenues would be credited with additional compensation. The board of directors of the Railway Express Agency approved the recommendation on June 24.

Roads which would be "debit" lines under the proposal have protested the basis for the readjustments on the grounds, among others, that the arrangement was carried out according to contract and cannot be modified retroactively and that car-foot-miles are not a true measure of service performed. These roads contend that, before the period of heavy war traffic, many lines actually filled far less than the assigned car floor space, so that they were able to handle the increased business later without any increase therein.

It is unofficially reported that the "credit" lines, meeting in Chicago on September 16, failed to reach an agreement on arbitration of the matter.

## Young Thinking of F. R. P. Merger with A. A. R.

Robert R. Young might be disposed to merge his Federation for Railway Progress into the Association of American Railroads if he wins his fight for "control" of the New York Central and thereby acquires also "control" of the association. The Chesapeake & Ohio chairman made that statement to reporters this week in Washington, D. C., where the Interstate Commerce Commission was holding hearings on his application for authority to serve on the N. Y. C. board of directors.

He had previously explained how he expected "control" of N. Y. C. to result in his "control" of the A. A. R., saying that the Central, the Pennsylvania and Union Pacific contribute about 25 per cent of the association's budget. He added that any road making the Central's contribution should have a firm grip on the "purse strings" and thus an important part in policy-making. In suggesting the possibility of a merger of the two organizations, Mr. Young indicated that the matter was not yet settled in his own mind; he said also that it might be found desirable for the federation to continue its separate existence.

He added that the federation now has 15,000 dues-paying members, including one "labor organization," which was later identified as the Chesapeake & Ohio Railway Employees Mutual Benefit Association. Meanwhile, Mr. Young had suggested "travel research" as something the A. A. R. should be doing.

He spoke also of "featherbedding," calling it "a crime against all of us." And he reiterated his complaint against "banker" influence on railroad boards of directors where there is "no ownership representation." Later on, Mr. Young conceded that bankers are "no worse" than management, labor, capital, or any other "special interest" which is seeking its own ends.

His further comment included condemnation of what he has observed to be the failure of railroad managements to press for necessary rate increases with sufficient vigor. Railroad presidents, he said, have no incentive to "raise hell" about low rates, because big shippers, who sit on railroad boards of directors, would regard it as "unfriendly" if carrier presentations in rate cases were "more than an act." Arguing that the carriers are entitled to a much higher return on their investment, Mr. Young asserted that "no industry is so undercapitalized" as the railroads.

## Authority to Increase Passenger Fares Sought by New Haven

The New York, New Haven & Hartford has asked the Interstate Commerce Commission for authority to increase, on one day's notice, its coach fares by 15 per cent—from 2.5 cents per mile to 2.875 cents per mile—and to apply a corresponding increase to its present minimum one-way fare of 15 cents. According to the New Haven, the proposed increases, if applied to both interstate and intrastate traffic, would produce additional revenues of \$5,300,000 in 1948. No increase is sought in first-class fares.

Indication that the New Haven would seek an increase in its coach fares was made this week by H. S. Palmer, president of the road, in testimony before the commission in Ex Parte 166, as noted elsewhere in this issue. In its petition, the New Haven observed that its passenger operations in 1946 produced a deficit of \$1,546,309 in net railway operating income. It estimated that its net railway operating income in 1947, at the present rate level, would produce a deficit of \$2,807,000, and indicated that the principal reason for proposing the additional increase (New Haven coach fares were raised in April from 2.2 to 2.5 cents per mile) is the "sudden impact of the September 1 wage increase."

## Strike on Union R. R. Ends

The "unauthorized" strike of operating employees of the Union ended on September 12, after that road's operation had been halted for eight days, when an agreement was reached between brotherhood and management representatives for the settlement of the dispute. As reported in *Railway Age* last week, steel production of the Carnegie-Illinois Steel Corporation, a United States Steel subsidiary (as is

the railroad) was cut practically to zero when the strike occurred.

The statement announcing the agreement indicated that the strikers had won an increase of 15 cents per hour in the basic wage rate, effective on their return to work. Any increase that may be awarded the operating unions as a result of general nationwide negotiations which are expected to begin soon will apply to those employees of the Union to the extent that it exceeds 15 cents an hour. The agreement incorporates provisions for vacations with pay, related to years of service, and establishes a one-year moratorium on rules change proposals by either party.

## Administration of Bankruptcy Act by I.C.C. to Be Probed

The Interstate Commerce Commission's handling of railroad reorganization cases under section 77 of the Bankruptcy Act will be the subject of a hearing starting September 30 at Washington, D. C., it has been announced by Senator Reed, Republican of Kansas, chairman of a subcommittee of the Senate committee on interstate and foreign commerce.

Senator Reed, who assailed the commission's practices at a press conference, as reported in *Railway Age* of August 9, page 71, said that he has been authorized by Senator White, Republican of Maine, chairman of the full committee, to conduct the investigation. Other members of the subcommittee are Senators Meyers, Democrat of Pennsylvania, and Hawkes, Republican of New Jersey.

According to Senator Reed, presently at his Parsons, Kans., home, it is his intention to call to the stand each member of the commission in order to "inquire his part in preparation of the various reorganization plans and on what he based his proposal for the new capitalization."

The subcommittee chairman is co-sponsor with Senator Meyers of a bill, S. 249, which would set up procedures for the voluntary readjustment of railroad financial structures, including provisions making such procedures applicable to certain railroads already undergoing reorganization as well as to roads not yet in the hands of the court. The bill was left pending on the Senate calendar when the recent session of Congress adjourned in July, and the House likewise failed to act on a similar measure, H.R. 3980, sponsored by Representative Reed, Republican of Illinois.

## Hearing Date Set on Government Charges Against Railroads

The Interstate Commerce Commission has set December 15 as the hearing date in the proceedings involving five of the complaints filed against the railroads by the federal government, which, as noted in *Railway Age* of August 9, page 75, and previous issues, has assailed various rates and charges on war freight. The hearings will be held at the commission's Washington, D. C., offices before Division 4.

The complaints, wherein reparations are sought for alleged overcharges, pertain to (1) rates for the shipments of crated automobiles; (2) refusal of the railroads to apply their export rates to government

freight destined for overseas but stopped "temporarily" at interior storage-in-transit depots; (3) rates on airplane landing mats; and (4) "policing rules" maintained by the railroads in the application of their transcontinental export rates to Pacific Coast ports, which, according to the Department of Justice, defeated the government's right to land grant deductions on military and naval export traffic.

The commission, in consolidating the proceedings for hearing, said that the five complaints present issues, which, in its opinion, are so closely related that their joint hearing and consideration is desirable or "even imperatively necessary." At the same time, however, it denied a request submitted by the railroads that all similar complaints filed by the government should be combined for a hearing on a single record.

According to the commission, the complaints set for hearing December 15 are "sufficiently comprehensive" to include all of the more important questions of law and fact presented by the complaints as a whole. "The other pending complaints," it said, "involve issues of somewhat more individual nature, which, it is believed, do not require joint consideration with those of the five complaints now assigned for hearing."

The commission directed the complainant to supply copies of its testimony to the commission and counsel for the defendants not later than December 1. It said that it will "subsequently announce" dates for which a similar arrangement will apply to the defendants.

### Johnson Again Raps "Rip Van Winkle" Ad

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disastrous car shortages in history." Then came his comment on the C. & O. as a coal and passenger road.

**"Critical" Coal Car Shortage**—"The most critical car shortage now is coal cars," Colonel Johnson continued. "Not only is the C. & O. a coal road, it is a good one, one of the best, although its movements are slower than the national average and it is slower than the Norfolk & Western which is exactly the same sort of a coal road, operating out of the same originating territory to the same destinations.

"If the western roads with the alleged agreements can maintain faster movements, it would be a good idea, if this saves cars, for the C. & O. to make such agreements. But speed does not necessarily save cars. In fact, during the war the O. D. T. slowed the schedules on the western roads in order to get more goods over the transcontinental single-track lines. That might need some explanation to you but I haven't the time, except to say that during the war we had hundreds of troop passenger trains a day over the transcontinental lines and innumerable fast premium freight trains for the Army, Navy, Marine Corps, Coast Guard and Merchant Marine. There is nothing more opposed and disruptive to schedules or car conservation than inordinately fast trains. Car days are saved in freight yards, at interchange points, and in prevention of congestion of all sorts.

"In addition to this, if the agreements to which Mr. Young refers are in existence, and perhaps they are, as I recollect the delivery in Chicago on perishables is the sixth morning. The short lines could not possibly make it on the fifth morning and the circuitous lines could not possibly stagger into a seventh morning. And, too, if there are such agreements, the effect would be that the short lines would slow their movements, and so far as movement is concerned, waste a few hours from the West coast to Chicago, which loss, if any, would be fully compensated by the circuitous lines expediting their movement."

In reporting that Mr. Young had made "no usable suggestions," Colonel Johnson said that, meanwhile, "we are doing many things to furnish sufficient transportation to the nation"; and "so far we have been reasonably successful." In closing, the O. D. T. director reminded Mr. Cole that the railroads are now doing a bigger job than they performed during the war.

"Just a short time ago," he said, "the nation as a whole was acclaiming the railroads for their miraculous service during the war. Now the war is over. The railroads with less are doing more and are on the verge, it appears, of being condemned for doing a poor job, whereas in effect they are more efficient than ever in their history.

"Strange to say, I have received no complaint from any traffic manager, of which there are literally thousands in the United States who look after the traffic and transportation interests of their firms, including the biggest to the smallest corporations and companies. Many inquiries have come in which, judged by the letterheads—and many have no letterheads, many are in longhand—indicate no familiarity with traffic and transportation."

### Felton Says Steel Is Still Bottleneck

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had been planned. If the current inventories were wholly in balanced car sets of steel, which unfortunately they are not, this metal could be run through assembly lines and exhausted in a little more than five weeks at the programmed rate of operations. Sustained high production cannot be achieved if the margin of metal supply is that tight, as well as unbalanced—particularly since supply conditions have not improved, but have become more uncertain, recently.

"During July the car builders received enough steel to build about 4,500 domestic freight cars. Discussions of the 10,000-car program have assumed that the railroad shops would build 1,500 cars monthly and the car builders, 8,500. Allowing for the time-lag of fabrication, this means that it should have been possible to achieve deliveries at that rate in September or October if steel had been received in the promised quantities in July. Actually, the car builders got only a little more than half the steel needed to meet the program. Following this persistent lag in the proposed steel supply program, future planning now is made uncertain by the rail-

strike in Pittsburgh which is crippling Carnegie-Illinois Steel, one of the principal suppliers of freight car types of steel.

"I have no doubt that the steel industry has lived up to its promises in delivering overall tonnages of steel to the railroads and railroad suppliers," Mr. Felton concluded. "However, to solve the nation's No. 1 transportation problem, the production of more freight cars, there must be a greater allocation of steel for new cars. I know that there are many demands upon the steel industry. It has done a remarkable job in holding production so high while the nation reconverted at such speed and to such high levels of output. But this new expansion of our economy in itself has increased the demand for freight cars, and in order to avoid undermining the great gains we have made, we must produce more freight cars. Ten thousand freight cars a month cannot be produced unless a sharply increased tonnage of steel is made available to the railway car builders and to railroad car shops. This is not merely a car builders' or a railroaders' problem. It is a national problem—a vital problem."

### Seaboard's New Florida Train

A streamline train as yet unnamed will begin operation December 12 between New York and Miami, Fla., and St. Petersburg over the lines of the Pennsylvania, the Richmond, Fredericksburg & Potomac, and the Seaboard Air Line, the latter road has announced. A contest in which the first prize will be \$500 will be announced to select a name for the new train.

Complementing the established "Silver Meteor" service, which provides afternoon departures from New York, the new train will be scheduled for morning departures, with one night en route to Florida destinations. It will be equipped with new roomette and bedroom sleeping cars, coaches with adjustable reclining seats, and dining cars with stainless steel kitchens.

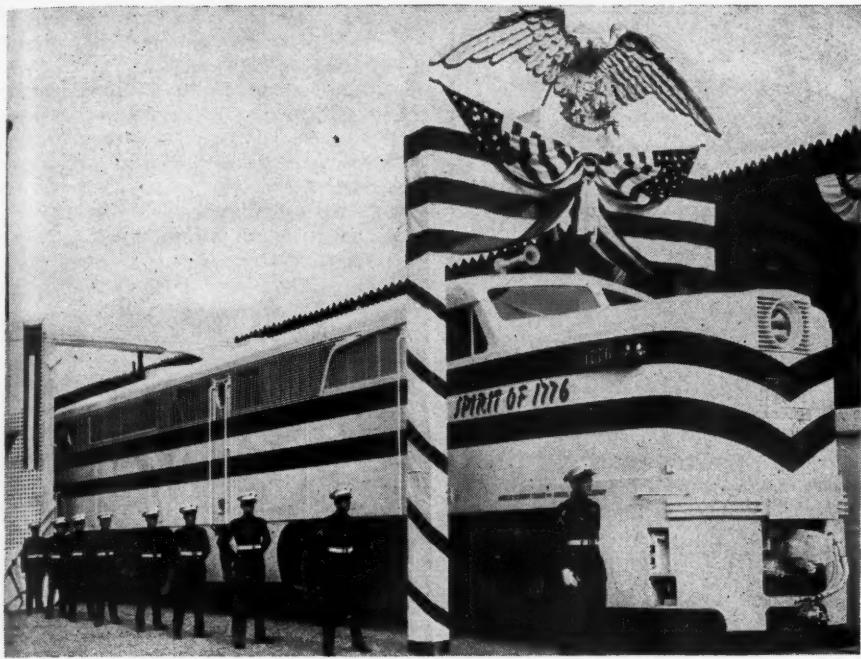
### R. E. A. Emergency Board

President Truman has issued an executive order creating an emergency board to investigate a dispute between the Railway Express Agency and certain of its employees represented by the International Brotherhood of Teamsters, Chauffeurs, Warehousemen and Helpers of America, American Federation of Labor.

A similar dispute between the R. E. A. and its employees represented by the Brotherhood of Railway Clerks was settled recently when those employees were given the same increase (15½ cents per hour) that was awarded by the arbitration board to non-operating railroad employees.

### 10 Years of Rocket Service

The Chicago, Rock Island & Pacific on September 19 marked the tenth anniversary of its inauguration of Diesel-powered "Rocket" service. The "Peoria Rocket," first of the railroad's streamliners to be put in service, has carried some 2,300,000 passengers on the Chicago-Peoria, Ill., run, and traveled approximately 2,500,000 mi. during a decade of record passenger



Alco-G. E. locomotive heads Freedom Train

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traffic, it was stated. The "Des Moines Rocket," placed in operation on September 26, 1937, will have transported an estimated 1,850,000 passengers in 10 years of daily service between Chicago and Des Moines, Iowa.

### Won't Control N.Y.C. as Director — Young

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be kept open. The Chrysler-Packard interest was in rates on new automobiles out of the Detroit area, it being their position that N. Y. C., the leading proponent of a lower rate scale, had thus far been successfully opposed by the C. & O.-Pere Marquette.

Questioning of witnesses by the automobile manufacturers' counsel, Parker McColister, indicated their fears that Messrs. Young and Bowman would bring the N. Y. C. around to the C. & O.-Pere Marquette way of thinking on this auto-rate matter. Mr. Young, in his testimony, made frequent references to this intervention, charging that it was an attempt by companies earning a "40 per cent" return to get lower rates out of an industry earning less than 2 per cent. It reminded him "of Doris Duke intervening in a wage proceeding to see that her footman doesn't get a raise."

Mr. Young's presentation got under way when he gave an outline of his career, saying that after a brief "retirement," of which he soon "tired," he began looking around in 1937 "for the easiest berth which I could find, the berth where I could make the greatest record with the least effort." He "chose the railroad business."

He then told how he acquired the former Van Sweringen holdings, saying that he and his associates stepped in and "saved" the Nickel Plate and Pere Marquette from the "rathole" of reorganization. The "bank-

ers," Mr. Young added, sought to have the C. & O. "save" the Erie, too, and they even "got Jesse Jones to put on some pressure" to that end. Mr. Young said he later found out that the "bankers" had some Erie loans outstanding.

**The Erie Phase**—He claimed that the Erie, "through our efforts," was the last road to go into bankruptcy and the first to come out; and it was the "only one" that preserved any equities. The witness predicted that the Missouri Pacific, in which Alleghany is also interested, would perhaps be another such case in view of the I. C. C.'s recent request for return of the reorganization plan for reconsideration in the light of changed conditions. In the cases of other bankrupt roads, which the "insurance companies were looking after," the stockholders were wiped out, Mr. Young said.

He later conceded, in response to questions from Assistant Director Boles, that the Erie was not the only reorganized road in which any equities were preserved; but he suggested that the presiding officer should indulge him in a "bit of poetic license" in view of the fact that there were only "two or three" such cases.

Meanwhile, Mr. Young had testified that his interest in a C. & O.-N. Y. C. tie-up had been aroused by Mr. Bowman after the Nickel Plate stockholders rejected the C. & O. merger offer. He called N. Y. C. "the finest railroad property in the richest country in the world," and said also that it should be the "most profitable" railroad.

If elected to the N. Y. C. board, Mr. Young plans, among other things, to promote better through service at Chicago. Also, he would endeavor to "sell" the Central "on the idea of a new lightweight train which the C. & O. is presently working on." The train, as Mr. Young described it, "weighs only a fifth as much per passenger as present trains"; it is "three and one-half feet lower, six inches wider, and is

rubber cushioned and can travel at speeds of 100 m. p. h. a lot easier than present equipment can travel at 60." Moreover, there would be a "front-end car" to carry "all of the service machinery which now clutters up the area between the bottom of the car and the rails."

**To Make Diesels "Obsolete"**—In another place, Mr. Young said that the C. & O. is now experimenting with a coal-burning, gas-turbine locomotive that "will make the Diesels obsolete." He objects to the use of Diesels, and would have the government order them off railroads. He does not think it is in the public interest to consume the country's oil supplies in that manner.

Earlier the C. & O. chairman had indicated how he thinks passenger services might be improved, and criticized the passenger-service policies of the railroads—the "progressive railroads," he called them, striking that sarcastic note many times. It was the "progressive" railroads, he said, that turned down the "\$75 million" he wanted to put into the rehabilitation of sleeping cars. They wouldn't take what they called his "sucker money," Mr. Young added. And he went on to say that "even if I was a sucker, they should have taken my \$75 million and let the public enjoy it."

In making his attack on the "bankers" more specific, Mr. Young said his remarks were not an indictment of all bankers, but only of "certain bankers," whom he named as J. P. Morgan & Co., "the Mellons," and Harriman & Company. Bankers as a whole, Mr. Young said, "are a fine bunch of people"; his grandfather was a banker, and so was his father.

As to J. P. Morgan & Co., he said "their railroad connection is the New York Central." As to the Mellons, "their railroad is the Pennsylvania"; and they "also are the Pullman Company," and "the Virginian, of whom you heard a lot this week, but they haven't said anything about the Mellons yet." Of Harriman & Company, Mr. Young said it "is the Union Pacific."

**Plans for the Central**—Asked what he could accomplish on the N. Y. C. board if he did not attain "control," Mr. Young indicated that he would undertake to "sell" his ideas or carry them to the public in advertising as he had done with respect to through coast-to-coast service, competitive bidding on securities, and the "black market" in Pullman reservations. When it was suggested that he could carry on advertising campaigns without a seat on the N. Y. C. board, Mr. Young replied that advertising "doesn't always work." He added that it hadn't worked yet on the matter of schedule agreements. The "Rip Van Winkle" ad, he went on, was four weeks old, and "I'm getting impatient."

In response to other questions on cross-examination, Mr. Young denied that he would be sitting "on both sides of the table" in cases where C. & O. and N. Y. C. interests were in conflict. He asserted that it was his practice to "lean over backwards" in such situations. He also accused counsel for the city of Norfolk and the Chrysler-Packard counsel of placing "narrow sectional" and "selfish" interests against railroad consolidations which are

the "key to national defense" and the "key" to minimizing the effects of the "next depression." Meanwhile, Mr. Young and other C. & O. witnesses had mentioned many times their vision of a C. & O.-N. Y. C. system that would be a worthy competitor of what they called the "Pennsylvania-Norfolk & Western-Wabash" system.

In response to questions as to how he proposed to remove "banker" control from the N. Y. C. board, Mr. Young said that he thought the "mere presence" of himself and Mr. Bowman would have that result. He did not recall that his election to the C. & O. board had resulted in any removals of other directors. He did, however, mention the case of former C. & O. President G. D. Brooke, who "was retired at 65 years of age on a \$25,000 pension and a \$25,000 consultant fee." Mr. Young added that he thought Mr. Brooke "was going to stay and advise us, but a few weeks later he turned up as chairman of the Virginian."

### Treasury Officers' Meeting

The Treasury Division of the Association of American Railroads will hold its annual meeting at the New Ocean House, Swampscott, Mass., on October 8-10. The program will include addresses by W. T. Faricy, president; E. H. Bunnell, vice-president, and Dr. C. S. Duncan, economist, of the A. A. R.; E. S. French, president, Boston & Maine; L. F. Whittemore, president, Federal Reserve Bank of Boston; and T. J. Tobin, comptroller, Erie (chairman, Accounting Division, A. A. R.), as well as reports by the sectional groups and the officers of the division.

### Operating Revenues in August 3.8 Per Cent Above 1946

From preliminary reports of 81 Class I railroads representing 81.4 per cent of total operating revenues, the Association of American Railroads has estimated that the August gross amounted to \$599,820,715, an increase of 3.8 per cent above the \$577,977,312 reported for the same 1946 month. Estimated August freight revenues were \$479,691,135, compared with \$443,674,245, an increase of 8.1 per cent, while estimated passenger revenues were \$75,482,952, compared with \$92,121,576, a decrease of 18.1 per cent. The estimate for all other revenues totaled \$44,646,628, compared with \$42,181,491, an increase of 5.8 per cent.

### Modification of Signaling Order Sought by Missouri Pacific

The Missouri Pacific and its subsidiary, the St. Louis, Brownsville & Mexico, have filed with the Interstate Commerce Commission a petition seeking modification of the commission's order of June 17 in the Docket No. 29543 proceeding. The M. P. and its affiliates had been given until September 17 to file their exceptions to the order, wherein the commission has required the carriers to install automatic train-stop or train-control systems, cab signal systems, or automatic block signals on lines over which high-speed trains are run.

The M. P. seeks modification of the order so as to permit it to operate pass-

### Ops May Demand 30-Cent Hourly Wage Increase

Demands for a wage increase of at least 30 cents an hour will probably be made upon the railroads by the five operating unions as a result of a meeting of the unions' representatives scheduled to be held in Cleveland, Ohio, on September 18. A. F. Whitney, president of the Brotherhood of Railroad Trainmen, declared in Chicago on September 17. These new demands are in addition to and separate from changes in some 44 working rules already "demanded" by the unions which would cost the railroads an estimated billion dollars annually. (See *Railway Age* of August 2, page 36.)

enger trains powered by Diesel-electric locomotives at a maximum speed of 85 m. p. h. between Poplar Bluff, Mo., and Texarkana, Tex., and between Hoisington, Kan., and Pueblo, Col. Both segments are protected by automatic block signals, while centralized traffic control also is used on the former. The M. P. also would operate passenger trains at a maximum speed of 65 m. p. h. and freight trains at a maximum speed of 50 m. p. h. between Nevada, Mo., and Carthage, described by the road as "non-signal" territory.

The St. Louis, Brownsville & Mexico seeks modification of the order so as to permit it to operate passenger trains hauled by Diesel-electrics at a maximum speed of 75 m. p. h.; other passenger trains at a maximum speed of 65 m. p. h.; and freight trains at a maximum speed of 50 m. p. h. between Vanderbilt, Tex., and Brownsville. That segment also is described as "non-signal" territory. The M. P. said that 1,078 miles of track are affected by the proposed modifications.

### I. C. C. Modifies Decision on Eastern Fare Increases

The Interstate Commerce Commission's recent decision, authorizing eastern railroads to increase their commutation fares and so-called multiple fares, also made certain modifications in the commission's May 20 order which authorized the eastern roads to increase their basic one-way fares from 2.2 to 2.5 cents per mile in coaches and from 3.3 to 3.5 cents per mile in parlor and sleeping cars. As noted in the *Railway Age* of September 13, page 86, the commission's conclusions as to the commutation- and multiple-fare phase of the case were substantially the same as those recommended by Examiner Burton Fuller and set out in detail in the issue of July 26, page 93.

As to the basic-fare phase, the railroads had filed a petition objecting to the May 20 order's failure to approve the proposed 5-cent minimum increase for short hauls and the double one-way basis for round-trip hauls between 100 and 200 miles. In the former connection the present report authorizes a scale of short-distance coach fares which reflects an average increase

of 4.7 per cent, and is set up on a diminishing basis per mile until the 2.5-cent basis is reached at 15.5 miles and over. For short-distance (22.5 miles or less) fares in sleeping and parlor cars, the proposed 5-cent minimum increase was authorized. With respect to round-trip fares, the present report grants the railroad request for authority to charge double the one-way basis for trips up to 200 miles.

### Welding Society Elects Magrath Executive Secretary

At a meeting on July 11, the board of directors of the American Welding Society unanimously selected Joseph Gordon Magrath to the new position of executive secretary of the society, the duties of which he assumed on September 2. As the chief staff officer of the society, Mr. Magrath will work with other members of the headquarters staff in directing the activities of this national engineering organization of about 7,500 members. M. M. Kelly, secretary; W. Spraragen, editor of the *Welding Journal* and director of the Welding Research Council; and S. A. Greenberg, technical secretary, will continue in their present duties.

Mr. Magrath was born in Philadelphia on July 28, 1899. He is a registered engineer of the state of Illinois, and in addition to being a member of the A. W. S., he is a member of the American Society for Metals, Society of American Military Engineers, and the Steam Specialties Club.



J. G. Magrath

New York. Just before joining the staff of the A. W. S., Mr. Magrath was sales manager of the McAlear Manufacturing division of Climax Industries, Inc.

From 1934 to 1944, Mr. Magrath was associated with the Air Reduction Sales Company. With this company he supervised market, process and product demand surveys and promotion sales activities through sales and service engineering staff of 26 district offices. Mr. Magrath was associated directly with welded product design as far back as 1917, first with the Budd Wheel Manufacturing Company on

the fabrication of wheel structures for the first world war "quads" (original four-wheel drive ordnance vehicles); then in 1922 and 1923 on welded steel sash, doors and plate fabrication for the David Lupton Sons Company. During the recent war he was active, while with the Air Reduction Sales Company, in the exploration of welding, cutting, brazing, and other flame-treatment processing of welded fabrication in shipyards on the East, Gulf and West coasts, as well as inland war plants and steel mills. Mr. Magrath has been active in the work of the New York section of the American Welding Society and served for several years as chairman of publicity and programs.

### Freight Car Loadings

Freight car loadings for the week ended September 13 totaled 922,360 cars, the Association of American Railroad announced on September 18. This was an increase of 113,310 cars, or 14.0 per cent, above the previous week, which included the Labor Day holiday, an increase of 15,191 cars, or 1.7 per cent, above the corresponding week in 1946, and an increase of 66,259 cars, or 7.7 per cent, above the comparable 1945 week.

Loadings of revenue freight for the week ended September 6 totaled 809,050 cars, and the summary for that week as compiled by the Car Service Division, A. A. R., follows:

#### Revenue Freight Car Loading

For the Week Ended Saturday, September 6			
District	1947	1946	1945
Eastern	140,743	141,205	124,413
Allegheny	166,364	176,445	155,554
Pocahontas	59,837	60,298	50,218
Southern	118,367	120,206	104,021
Northwestern	135,384	123,078	125,030
Central Western	127,024	116,930	116,749
Southwestern	61,331	56,321	53,869
Total Western Districts	323,739	296,329	295,648
Total All Roads	809,050	794,483	729,854
Commodities:			
Grain and grain products	47,733	42,746	51,498
Livestock	14,565	9,784	16,810
Coal	156,384	166,900	144,557
Coke	12,829	12,912	10,996
Forest products	44,635	45,941	36,756
Ore	75,995	66,392	70,471
Merchandise l.c.l.	103,267	107,866	92,931
Miscellaneous	353,642	341,942	305,835
September 6	809,050	794,483	729,854
August 30	925,732	908,440	860,342
August 23	900,895	884,955	853,426
August 16	906,305	887,553	652,852
August 9	905,244	899,086	870,002
Cumulative total, 36 weeks	30,315,204	27,695,636	29,488,196

*In Canada.*—Car loadings for the week ended September 6 totaled 73,120 cars as compared with 81,553 cars for the previous week and 70,406 cars for the corresponding week last year according to the compilation of the Dominion Bureau of Statistics.

	Revenue Cars Loaded	Total Cars Rec'd from Connections
Totals for Canada:		
September 6, 1947	73,120	33,075
September 7, 1946	70,406	32,509
Cumulative totals for Canada:		
September 6, 1947	2,632,522	1,311,454
September 7, 1946	2,432,645	1,223,332

Additional general news appears on page 92.

## Equipment and Supplies

### LOCOMOTIVES

The SEABOARD AIR LINE has placed orders for 21 Diesel-electric locomotives. Twelve 2,000-hp. passenger engines will be built by the Electro-Motive Division of the General Motors Corporation and 6 1,500-hp. freight engines and 3 1,000-hp. switching engines will be constructed by the American Locomotive Company.

### FREIGHT CARS

The CHICAGO HEIGHTS TERMINAL TRANSFER, controlled by the Chicago & Eastern Illinois, has ordered 25 70-ton covered hopper cars from the General American Transportation Corporation and 15 70-ton gondola cars from the Pressed Steel Car Company. Delivery of both lots of cars is scheduled for the second quarter of 1948.

The ILLINOIS TERMINAL has ordered 100 50-ton box cars from the American Car & Foundry Co. Delivery of the cars is scheduled for the second quarter of 1948.

The LEHIGH VALLEY has ordered 500 55-ton hopper cars from the Bethlehem Steel Company. An inquiry for this equipment was reported in the *Railway Age* of August 23.

The SHELL CHEMICAL CORPORATION, San Francisco, Cal., has ordered 36 8,000-gal. aluminum tank cars from the American Car & Foundry Co. The cars, to be of all-welded construction, will be used for the transportation of synthetic glycerine and are to be built at Milton, Pa.

The SEABOARD AIR LINE has ordered 500 50-ton steel box cars from the Pressed Steel Car Company and 300 70-ton steel hopper cars from the Bethlehem Steel Company. The box cars will be built at Mt. Vernon, Ill., and the hopper cars at Johnstown, Pa. Deliveries of both lots are scheduled for early next year.

The SEABOARD AIR LINE is inquiring for 100 low-side solid-bottom gondola cars and 300 high-side solid-bottom gondola cars.

The board of directors of the WHEELING & LAKE ERIE has authorized the purchase of 1,000 70-ton hopper cars and 12 covered hopper cars.

### IRON AND STEEL

The PENNSYLVANIA has placed orders for 58,000 net tons of 133-lb. rails, 34,000 net tons of 140-lb. rails and 49,000 net tons of 155-lb. rails at an approximate cost of \$7,896,000. Of the total, 70,500 tons were ordered from the Carnegie-Illinois Steel Corporation, 62,000 tons from the Bethlehem Steel Company and 8,500 tons from the Inland Steel Company.

### SIGNALING

The UNION SWITCH & SIGNAL CO. is furnishing two sets of composite two-indication continuous train control and intermittent-inductive automatic train-stop equipment for Diesel passenger locomotives now being built for the Illinois Central.

The BALDWIN LOCOMOTIVE WORKS has ordered four sets of intermittent-inductive train-control equipment from the General Railway Signal Company. This equipment will be installed on Diesel-electric freight locomotives for the New York Central.

### Car Service

I. C. C. Service Order No. 772, effective from September 17 until December 31, directs the Green Bay & Western and Kewaunee, Green Bay & Western to: (1) discontinue withholding loaded freight cars, and accompanying shipping documents, consigned to industries on the Ahnapee & Western; (2) deliver to the Ahnapee such cars and documents now being withheld; and (3) resume normal freight-car interchange arrangements with the Ahnapee. The order says that Director J. Monroe Johnson of the Office of Defense Transportation had written to the commission advising that the Green Bay and Kewaunee, on the one hand, and the Ahnapee, on the other, "are engaged in a financial dispute" and that the two former companies are withholding delivery of carload freight to the latter, "thus retarding and diminishing the utilization of freight cars urgently needed in the domestic economy."

I. C. C. Service Order No. 394, which restricts free time on refrigerator cars at ports, has been modified and reissued as Revised Service Order No. 394. The revised order, effective from September 22 until February 5, 1948, limits its application to import, export, coastwise and inter-coastal freight, allowing a maximum of five days free time on such shipments. Prior to the division, the order also had provisions applying to reefers moving in domestic commerce.

Fourth Revised I. C. C. Service Order No. 104, which provides for the substitution of RS type refrigerator cars for box cars on westbound transcontinental carload shipments, has been modified and reissued as Fifth Revised Service Order No. 104. The principal change made by the revised order, effective from September 9 until January 21, 1948, has the effect of reinstating Minnesota, North and South Dakota, Montana, Washington, Oregon and northern Idaho as destination territory to which the refrigerator cars may be loaded from points in the East and South. Also, it has been made clear that the order does not apply to perishable freight, this being in accordance with previous interpretations made by the commission.

I. C. C. Service Order 498-A, effective September 15, vacated Service Order No. 498 which had required the Southern Pacific to divert to the Pacific Electric at Colton, Cal., traffic moving to Los Angeles Harbor and Long Beach.

## Organizations

The Car Department Association of St. Louis will meet at the DeSoto Hotel, St. Louis, Mo., on September 23 at 8 p.m. A. C. Fortey, field supervisor, Preco, Inc., will present a paper entitled The Modern Refrigerator Car.

The New York Traffic Club will hold its regularly monthly meeting in the club rooms at the Biltmore Hotel, September 23 at 8 p.m.

The New York Chapter of the Railroad Enthusiasts will be addressed by Walter F. Collins, chief engineer of the New York Central, at its meeting on September 24, at 7:45 p.m., at Grand Central Terminal, room 5928. Mr. Collins' subject will be "New York Central Motive Power." The motion picture "New Trains for Old" will also be shown.

A meeting of the Railway Club of Pittsburgh, Pa., has been scheduled for 8 p.m. September 25, at the Fort Pitt Hotel, Pittsburgh. E. P. O'Neil, sales engineer of the Hyatt Bearings Division of General Motors Corporation will present a paper entitled "Passenger Car Journal Box Maintenance" which will be illustrated by motion pictures.

The fall meeting of the New England Shippers Advisory Board will be held at the Kimball hotel, Springfield, Mass., on October 2.

## Supply Trade

John S. Dimon has been appointed special railway representative for the southeast division for Bowser, Inc., with head-



John S. Dimon

quarters in Washington, D. C. Mr. Dimon was formerly industrial sales manager for the Pennsylvania Salt Company.

Arthur A. Bernard, who has worked on the development and practical applica-

tion of welding processes, equipment and accessories for many manufacturers, has announced the opening of his own development laboratory and manufacturing plant, the **Bernard Welding Equipment Company**, at 741-43 East 71 street, Chicago.

The **Nordberg Manufacturing Company**, Milwaukee, Wis., has announced the appointments to vice-presidencies of **H. H. Talboys**, formerly manager of the railway equipment division, **Roland W. Bayerlein**, formerly manager of the heavy machinery division, **D. A. Cheyette**, formerly manager of the crusher division, and **R. R.**



Henry H. Talboys

**Shafter**, formerly manager of the process machinery division. Before joining Nordberg in 1923 as manager of the railway equipment division, Mr. Talboys was associated successively with the National Railway Construction Company, the Oliver Iron Mining Company, the Ingersoll Rand Company and the Lake Superior Loading Company.

**David E. Gow**, formerly branch manager of the Cleveland, Ohio, office of the Asbestos Textile & Packing division of **Raybestos-Manhattan, Inc.**, has been appointed packing sales manager, with headquarters in Manheim, Pa., to succeed **Jack E. Cole**, who has been appointed Chicago branch manager of the equipment sales division.

**James G. Graham** has been appointed sales manager of the railroad division of **Fairbanks, Morse & Co.** Mr. Graham will continue to maintain his headquarters at the main office in Chicago, where he has served as district manager of the railroad division since joining the company a year and a half ago.

The **Huron Manufacturing Company**, 3240 E. Woodbridge street, Detroit 7, Mich., has been appointed national railway sales representative for the **Airetool Manufacturing Company**, Springfield, Ohio.

**Charles R. Moffatt**, director of advertising of the **United States Steel Corporation**, will retire on September 30, after 40 years' service with the corporation, it has been announced.

**Charles F. Naylor** has been appointed

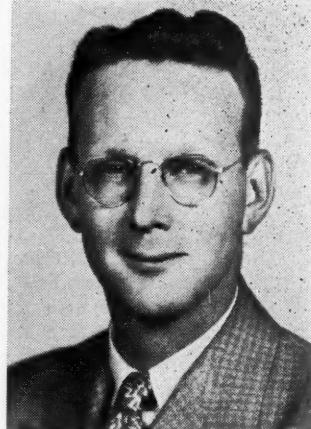
treasurer and general manager of the **Hastings Signal & Equipment Co.**, to succeed his late father **Harry H. Naylor**. The appointments of **Marshall J. Ross** as sales manager; **Richard B. Dellheim** as safety consultant; **Elmer P. Atherton** as general counsel; **Frank Celona** as plant engineer; and **Ray Cleona** in charge of production, also were announced.

**Railway Radio-Telephone, Inc.**, has appointed the **O. K. Company**, of which **Tom R. King** is president and **Karl V. Graff** is vice-president, as its sales representatives in Chicago, and **J. M. Welles** as its sales representative in Los Angeles, Cal. Offices of the O. K. Company are located at 513 Railway Exchange Building, Chicago, and offices of Mr. Welles are located at 112 West Ninth street, Los Angeles.

**Hubert E. Snyder**, formerly with the **Penn Metal Corporation**, has been appointed managing director of the **Toncan Culvert Manufacturers Association**, to succeed **P. H. Pickering**, resigned.

**Charles S. Sliter**, formerly sales promotion manager for the **American Brake Shoe Company**, has been appointed assistant general sales manager for the firm's Kellogg division, with headquarters in Rochester, N. Y.

**Howard N. Inwood**, member of the equipment engineering staff of the **Automatic Electric Company**, has been appointed manager of railroad sales of the **Automatic Electric Sales Corporation**, with headquarters in Chicago. This appointment is coincident with the company's plans for expansion of activity in the railroad field, which include the setting up of special facilities for the manufacture of railroad communication apparatus, thus permitting continuation of production of telephones and switching equipment for independent telephone companies. In his new capacity Mr. Inwood will assume charge of all promotional activities relating to products of interest to the communication and signal departments of railroads.



Howard N. Inwood

Mr. Inwood was born on June 5, 1910, at Elkhart, Ind., and attended Crane College, in Chicago, from 1928 to 1930, and the University of Illinois, of which he is a graduate electrical engineer, from 1930 to

1933. He entered the services of the Automatic Electric Sales Corporation, as a sales engineer, in 1933, remaining with that company until 1934. In 1935 he was employed as a mechanical and electrical engineer in the signal department of the New York Central, and from 1936 to 1937 he was a sales and design engineer with the Ryerson Steel Company in Chicago. From 1937 to 1938 Mr. Inwood served as a mechanical and electrical engineer in the signal department of the Michigan Central, and from the latter year until 1939, he was a mechanical and electrical engineer on quality standards with the Western Electric Company. Mr. Inwood returned to the Automatic Electric Company in 1939, as an electrical design engineer, which position he held at the time of his latest appointment as manager of railroad sales of the Automatic Electric Sales Corporation in Chicago.

## OBITUARY

**W. F. Hebard**, president of W. F. Hebard & Co., Chicago, died on September 4 at Evanston, Ill.

**Harry H. Naylor**, former treasurer and general manager of the Hastings Signal & Equipment Co. of Boston, Mass., died recently.

## Construction

**CHESAPEAKE & OHIO**.—Recent contracts awarded for construction work on the Pere Marquette district of this road include the following, with estimated costs in parentheses: to Darin & Armstrong of Detroit, Mich., to construct service building for Diesel locomotives at Wyoming, Mich. (\$327,000); to Jutton-Kelly Company, Dearborn, Mich., for new culvert at Ox creek, Benton Harbor, Mich. (\$76,500); to Jutton-Kelly Company, for reconstruction of bridges MA 24.9 and MA 13.7 on Manistee (Mich.) branch, so that they will support heavier power (\$82,500); and to Taber-Carmody Company, Grand Rapids, Mich., to construct line change approximately 1 1/4 mi. long, at Brighton, Mich. (\$105,000). Centralized traffic control is being installed by railroad forces between St. Joseph, Mich., and E. Saugatuck at a cost of \$425,000.

**READING**.—Division 4 of the Interstate Commerce Commission has authorized this road to construct a 2.5-mile line from Boston Run Junction, Pa., to Frackville Junction. The segment will replace a line abandoned by the Pennsylvania, over which the Reading operated under a trackage rights agreement. The Reading will finance the construction, estimated to cost \$236,500, from treasury funds.

**TEXAS & PACIFIC**.—This road has recently awarded the following contracts: to the Bock Construction Company of Dallas, Tex., for remodeling combination passenger and freight depot at Sherman, Tex. (\$25,000); to Andrews & Osborne of Fort Worth, Tex., for construction of

a structural steel and concrete pool car dock, 50 ft. by 350 ft., at Fort Worth (\$75,000); to Robert E. McKee of El Paso, Tex., for remodeling combination passenger and freight depot at Colorado City, Tex. (\$60,000); and to the Glade Construction Company of Fort Worth, for replacing timber platforms with reinforced concrete platforms at passenger station in Fort Worth (\$57,000).

## Financial

**BALTIMORE & OHIO**.—*Equipment Trust Certificates*.—Division 4 of the Interstate Commerce Commission has authorized this road to assume liability for \$5,600,000 of Series V 2 per cent equipment trust certificates, the proceeds of which will be applied toward the purchase of 2,000 open-top steel hopper cars at an estimated cost of \$7,003,000. The certificates will mature in 10 equal annual installments, starting September 1, 1948. The report also approves a selling price of 99.07189, the bid of the Mellon National Bank & Trust Co., on which basis the average annual cost will be approximately 2.19 per cent.

**CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA**.—*Equipment Trust Certificates*.—Division 4 of the Interstate Commerce Commission has authorized this company to assume liability for \$1,560,000 of equipment trust certificates, the proceeds of which will be applied toward the purchase of equipment estimated to cost \$2,117,900, as outlined in *Railway Age* of August 9, page 79. The certificates will mature in 10 equal annual installments starting October 1, 1948. The report also approves a selling price of 98.57 per cent with a 1 1/4 per cent interest rate, the bid of the First National Bank of Chicago, on which basis the average annual cost will be approximately 2.04 per cent.

**MISSOURI PACIFIC**.—*Revamp Plan Remanded to I. C. C.*.—The U. S. circuit court of appeals at St. Paul, Minn., on September 9 ordered the U. S. district court at St. Louis, Mo., to return to the Interstate Commerce Commission for reexamination the plan approved by it for this road's reorganization. The court of appeals granted 6 appeals by bondholders' groups who had sought reversal of an order in the Eastern Missouri district court and remanded the case with directions that the lower court return the plan to the I. C. C. for such further recommendations as shall appear proper to the commission. It was emphasized by the circuit court that both appellants and appellees, in addition to the commission, had filed briefs urging that the plan be referred back.

**NEW YORK, NEW HAVEN & HARTFORD**.—*Reorganization Plan Ordered into Effect*.—Federal Judge C. C. Hincks at New Haven, Conn., signed an order on September 11 authorizing this road to put its reorganization plan into effect. The order terminated the trusteeship and permitted the reorganization committee to proceed with the plan which has been approved

by the Interstate Commerce Commission. The order will become effective when the company receives from the I. C. C. authorizations covering the issuance of new securities, the assumption of obligations and the transfer of property. Company officers were reported to have said a proposal is under consideration for the New Haven to purchase the Boston & Providence, which it has operated through a lease held by the Old Colony, which in turn has been operated by the New Haven under a 99-year lease.

## Average Prices Stocks and Bonds

	Sept. 16	Last week	Last year
Average price of 20 representative railway stocks	46.85	47.98	52.31
Average price of 20 representative railway bonds	88.45	88.86	91.03

## Dividends Declared

**Mahoning Coal**.—irregular, \$12.50, payable October 1 to holders of record September 22.

**Norwich & Worcester**.—8% preferred, \$2.00, quarterly, payable October 1 to holders of record September 15.

**Savannah & Atlanta**.—5% preferred, \$1.25, quarterly, payable October 1 to holders of record September 10.

**Wheeling & Lake Erie**.—common, 75¢, payable October 1 to holders of record September 22; 4% prior lien, \$1.00, quarterly; 5 1/2% convertible preferred, \$1.37 1/2, quarterly, both payable November 1 to holders of record October 20.

## Overseas

**ARGENTINA**.—The Argentine State Railways have requested bids by November 14 for the manufacture of 2,500 1-meter gage railroad cars of various types and an unspecified quantity of repair parts, according to Foreign Commerce Weekly, a publication of the Department of Commerce. Complete details about materials and the conditions for bidding may be obtained from Oficina de Licitaciones, Avenida Maipu 4, Buenos Aires, upon payment of 200 Argentine pesos, approximately \$50.

## Abandonments

**DULUTH, MISSABE & IRON RANGE**.—Division 4 of the Interstate Commerce Commission has authorized this road to abandon approximately 1.1 mile of its Eve Lake branch in Lake County, Minn., and approximately 0.5 mile of its Allen Junction-Virginia main line near Franklin, Minn.

**EVANSVILLE SUBURBAN & NEWBURGH**.—This road has applied to the Interstate Commerce Commission for authority to abandon its entire line, extending approximately 18 miles from Evansville, Ind., to Boonville. The applicant stated that future operation of the line would be uneconomical, unsafe and not in the public interest.

**ROCHESTER, HORNELLSVILLE & LACKAWANNA**.—Division 4 of the Interstate Commerce Commission has authorized the American National Red Cross to abandon this road, which extends 9.3 miles from

Moraine, N. Y., to Hornell. The Red Cross acquired the line from Clara A. H. H. Smith, who was the sole owner at the time of her death in 1934. Operation, with exception of certain trackage and terminal facilities used by the Erie at Hornell, was abandoned by the Pittsburg, Shawmut & Northern last year. Continuation of operation of the facilities at Hornell is contemplated by the Erie through the purchase for \$32,500 of the property involved.

## FINANCIAL, LEGAL AND ACCOUNTING

**Robert Daley**, chief clerk to the auditor of disbursements of the Central of New Jersey, has been appointed to the newly-created position of assistant to the chief accounting officer, with headquarters as before at Jersey City, N. J. Mr. Daley, who joined the Jersey Central in 1917 as a rodman in the chief engineer's office, has been chief clerk to the auditor of disbursements for the past five years.

## Railway Officers

### EXECUTIVE

**M. B. Osburn**, assistant vice-president, operating department, of the Pullman Company, with headquarters at Chicago, will become vice-president—operating, on September 30, succeeding **James M. Carry**, who will resign on that date.

**W. A. Mather**, whose election as vice-president of the Prairie region of the Canadian Pacific, with headquarters at Winnipeg, Man., was reported in *Railway Age* of August 23, was born at Oshawa, Ont., on September 12, 1885, and attended McGill University. He entered railway service in May, 1903, in the construction department of the Canadian Pacific and in January, 1911, he became resident engineer at Winnipeg. In March, 1912, Mr. Mather was appointed superintendent at Kenora, Ont., being transferred to Medicine Hat, Alta., in January, 1915. On June 1, 1915, he was promoted to assistant general super-



**W. A. Mather**

intendent of the British Columbia district, and he was appointed general superintendent of the Saskatchewan district in October, 1918, being transferred to Calgary, Alta., in December, 1932. Mr. Mather was promoted to assistant to vice-president at Montreal, Que., in May, 1933, becoming general manager of the Western lines at Winnipeg in September, 1934.

On May 6, 1942, he was advanced to vice-president of the Western lines, with the same headquarters, the position he held at the time of his recent appointment.

### OPERATING

**G. W. Birk**, the announcement of whose appointment as assistant general manager of the Big Four district of the New York Central system, with headquarters at Indianapolis, Ind., appeared in *Railway Age* of August 23, was born at Indianapolis on April 19, 1900, and was graduated by Purdue University in 1925 with the degree of B. S. in mechanical engineering. He entered the service of the Cleveland, Cincinnati, Chicago & St. Louis (part of the N. Y. C. system) in 1918, and served as apprentice, special apprentice, and special engineer, at Indianapolis, until 1930, when he became assistant airbrake supervisor. On February 16, 1936, he was appointed special inspector, and on October 1, 1937, he was named lubrication inspector. Mr.

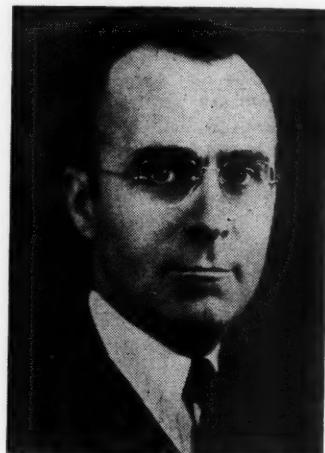


**G. W. Birk**

Birk became supervisor of locomotive and fuel performance at Buffalo, N. Y., on August 1, 1940; assistant to the general superintendent of motive power and rolling stock at New York on February 1, 1941; superintendent of locomotive shops at Beech Grove, Ind., on July 16, 1941; and assistant to the general superintendent of motive power and rolling stock at New York on July 1, 1942. On February 1, 1944, he was promoted to assistant superintendent of equipment at Indianapolis, and on January 1, 1946, he was advanced to superintendent of equipment, the position he held at the time of his recent promotion.

**James P. Downey** has been appointed assistant general manager of the New York City department of the Railway Express Agency, as reported in *Railway Age* of September 13. Mr. Downey has held various supervisory positions with the Agency,

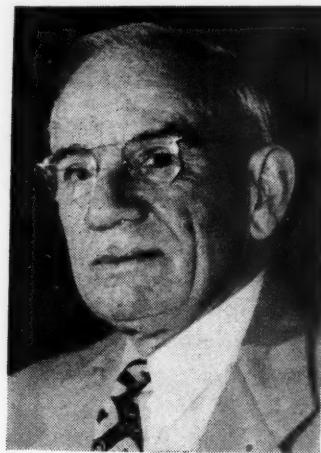
among them superintendent of the Boston and Susquehanna divisions and chief clerk to the president. He was superintendent of organization at New York at the time



**James P. Downey**

of his recent appointment to the newly-created position of assistant general manager of the New York City department.

**Samuel L. Price**, whose appointment as general superintendent of freight transportation of the New York Central at New York was reported in *Railway Age* of August 23, was born at New York on February 18, 1884, and was educated in New York City schools and City College. Mr. Price entered the service of the New York Central in 1900 as clerk in the office of the general superintendent at New York, subsequently serving as stenographer, secretary and chief clerk in the offices of the assistant general manager, general manager



**Samuel L. Price**

and vice-president. During World War I he was secretary to the New York Committee of the Association of American Railroads. Mr. Price was appointed assistant to manager of freight transportation of the New York Central at New York in 1933, which position he held until his recent appointment.

**Alex Grant**, assistant superintendent of transportation of the Gulf, Mobile & Ohio at Mobile, Ala., retired on August 31, after 50 years of railroad service. Mr. Grant entered railroad service as clerk-stenog-

take  
the check reins  
off ...

**T**HE monthly mileage of the modern Iron Horse is too often limited by "Check Rein" schedules that don't take into consideration the improvements made in modern steam power. The economy of the modern steam locomotive lies in its ability to haul heavy payloads at high speeds . . . with a minimum of preventive maintenance.

Take advantage of the high serviceability that is an inherent feature of modern steam power . . . utilize its high hauling capacity to the fullest. A series of availability studies and a streamlined scheduling program will enable you to get maximum returns from the dollars invested . . . and will effectively prove that the modern iron horse is, and will continue to be, a potent factor in modern, *economical railroading*.

LIMA LOCOMOTIVE WORKS



INCORPORATED, LIMA, OHIO

rapher with the Lake Shore & Michigan Southern (now New York Central) at Buffalo, N. Y., subsequently becoming secretary to the general manager of the Chicago & North Western at Chicago. He later went with the Chicago & Alton as secretary to the president, then becoming chief clerk to the chief operating officer, and superintendent of transportation, successively. With the merger of the Alton and the Gulf, Mobile & Ohio, Mr. Grant was transferred to Mobile and on June 1, 1947, was appointed assistant superintendent of transportation of the system.

## TRAFFIC

**H. T. Bolton**, commercial agent of the Central of Georgia at Winston-Salem, N. C., has been appointed division freight and passenger agent, with headquarters at Augusta, Ga., succeeding **W. C. Kilgore**, who has retired under the rules of the company, after about 50 years of continuous service with this road.

**Harold F. Keelen**, commercial agent of the Erie at Seattle, Wash., has been promoted to general agent, with headquarters at Portland, Ore., succeeding **H. L. Skeen**, who has retired.

**Allen A. Lister** has been appointed general traffic manager of the Terminal Railroad Association of St. Louis, with headquarters at St. Louis, Mo.

**G. A. Langworthy**, division freight and passenger agent of the Chicago & North Western at Des Moines, Iowa, has been appointed traffic manager, with headquarters at Omaha, Neb., succeeding **G. A. Remington**, who has retired after 47 years of railroad service. A photograph of Mr. Remington and a sketch of his career appeared in *Railway Age* of February 1. **F. A. Brown**, general passenger agent at Minneapolis, Minn., has retired. **R. A. Pierce**, city ticket agent at Minneapolis, has been appointed assistant general passenger agent, with the same headquarters. **J. M. Peters**, division freight agent at Omaha, has been appointed division freight and passenger agent at Des Moines. **W. H. Kreiling** has been appointed general freight and passenger agent at Milwaukee, Wis. **D. G. Payne** has been appointed general agent, passenger department, at Milwaukee, succeeding **E. P. Reuter**, who has retired.

**Oscar L. Grisamore**, freight traffic manager of the Illinois Central at Chicago, has been appointed general freight traffic manager, with the same headquarters. **John D. Cameron**, assistant traffic manager, has been appointed freight traffic manager, with headquarters as before at St. Louis, Mo. **O. C. Stein**, assistant freight traffic manager at New Orleans, La., has been appointed freight traffic manager at that point. **J. R. MacLeod**, assistant freight traffic manager at Memphis, Tenn., has been appointed freight traffic manager, with the same headquarters.

**E. L. Tomlinson**, whose appointment as general passenger agent of the Jersey Central Lines at New York was reported in *Railway Age* of August 30, was born on September 15, 1897, at Washington,

D. C., where he attended public and private schools. Entering railroad service in 1914 with the Washington Terminal, he resigned in 1917 to become ticket agent for the Peninsular & Occidental Steamship Co. at Havana, Cuba. Mr. Tomlinson engaged in private business in Washington in 1918 and in 1920 became treasurer of the B. F. Keith theater in Washington. In 1923 he became purser for the Norfolk & Washington Steamboat Co. and the following year re-entered railroad service with the Washington Terminal. He went with the Baltimore & Ohio at New York in 1926 and the following year he was appointed city passenger agent of the Jersey Central at New York. Mr. Tomlinson subsequently served as traveling passenger agent of the latter road at Wilkes-Barre, Pa., Newark, N. J. and Scranton, Pa., and in 1938 was appointed district passenger agent at New York. In 1941 he was transferred to Newark, N. J., which position he occupied at the time of his present appointment.

**John R. Mulroy**, whose appointment as general freight agent of the Chicago, Indianapolis & Louisville, with headquarters at Chicago, was reported, in *Railway Age* of August 23, was born at Chicago on November 10, 1901, and received his higher education at De Paul University, Chicago. He entered railroad service in November, 1946, as assistant general freight agent of the Monon at Chicago. He was previously owner and operator of the Mulroy Coal Company.

## ENGINEERING & SIGNALING

**W. Reed Peck**, whose appointment as principal assistant engineer of the Georgia at Atlanta, Ga., was reported in *Railway Age* of June 28, was born at Sherburn, Ky., on January 2, 1905, and was graduated in civil engineering from the University of Kentucky in 1926. After three months as a civil engineer with the State Highway Department of Kentucky, Mr. Peck entered railroad service in September, 1926, as assistant engineer of the Atlanta & West Point and the Georgia, serving in that capacity until May, 1934, when he went with the Illinois Central. In October of that year he became highway engineer, State Highway Department of Georgia, where he remained until January, 1937. On the latter date Mr. Peck was appointed division engineer of the Atlanta & West Point, the Western of Alabama and the Georgia, serving in that capacity until June, 1944, when he became engineer maintenance of way of those roads. He was serving in the latter capacity at the time of his recent appointment as principal assistant engineer.

## MECHANICAL

**J. A. Andreucetti**, whose retirement as chief electrical engineer of the Chicago & North Western, at Chicago, was reported in *Railway Age* of July 5, was born at Chicago on May 1, 1881, and entered the service of the North Western in 1905 as an electrician's helper. From 1908 to 1916 he served successively as electrician, acting foreman and foreman on electrical construction, and general foreman. In Sep-

tember, 1916, he was appointed assistant electrical engineer, and served in that capacity until May, 1927, when he was promoted to electrical engineer. In 1944 Mr. Andreucetti was advanced to chief electrical engineer, the position he held at the time of his retirement.

**O. P. Jones** has been appointed electrical engineer of the Chicago & North Western at Chicago, succeeding **W. H. Chapman**, whose appointment as chief electrical engineer was reported in *Railway Age* of July 5. **S. Fesus** and **W. L. Pratt** have been appointed general car foremen at Chicago. **E. J. Cheverette** has been appointed general car foreman at Clinton, Iowa, succeeding **Richard Reed**, who has retired. **E. F. Iverson** has been appointed general car foreman at Council Bluffs, Iowa, replacing **H. W. Hanson**, who has retired.

**Edgar B. Fields**, assistant engineer of tests of the Atchison, Topeka & Santa Fe at Topeka, Kan., has been appointed engineer of tests, with the same headquarters, succeeding **Walter Bohnstengel**, who has retired after 36 years of service.

**M. R. Wilson**, whose promotion to superintendent of motive power of the Chicago, Rock Island & Pacific, at Chicago, was reported in *Railway Age* of August 23, was born at St. Joseph, Mo., on June 17, 1898, and entered railroad service in 1914 as a machinist apprentice of the Wabash at Decatur, Ill. From 1918 to 1922 he served as a machinist with the Missouri-Kansas-Texas, the St. Louis-San Francisco, and the New York Central. After a short period of service as master mechanic for a lumber company. Mr. Wilson entered the service of the Rock Island in 1924, and served until 1929 as assistant foreman, erecting foreman, and roundhouse foreman, at Cedar Rapids, Iowa. From 1929 to 1942 he was roundhouse foreman and general foreman at various points on the Rock Island. In 1942 he was appointed master mechanic at Chicago, the position he held at the time of his recent promotion.

## PURCHASES AND STORES

**J. T. Healy**, expeditor and adjustment clerk of the Louisville & Nashville, has been appointed assistant to the general purchasing agent, with headquarters at Louisville, Ky.

**A. L. Dumas** has been appointed district storekeeper of the Chicago & North Western at Winona, Wis., succeeding **A. J. Spuhler**, who has retired. **R. F. Schram**, stationer, at Chicago, has retired.

## OBITUARY

**Francis V. Coffey**, chief freight service assistant in the office of the manager of freight transportation, New York Central system, died suddenly of a heart attack on September 12 in his office at New York, at the age of 50.

**Paul P. Hastings**, who retired in 1942 as vice-president in charge of traffic of the Atchison, Topeka & Santa Fe, died on September 16, at Saratoga, Cal.

# MORE POWER FROM THE BOILER

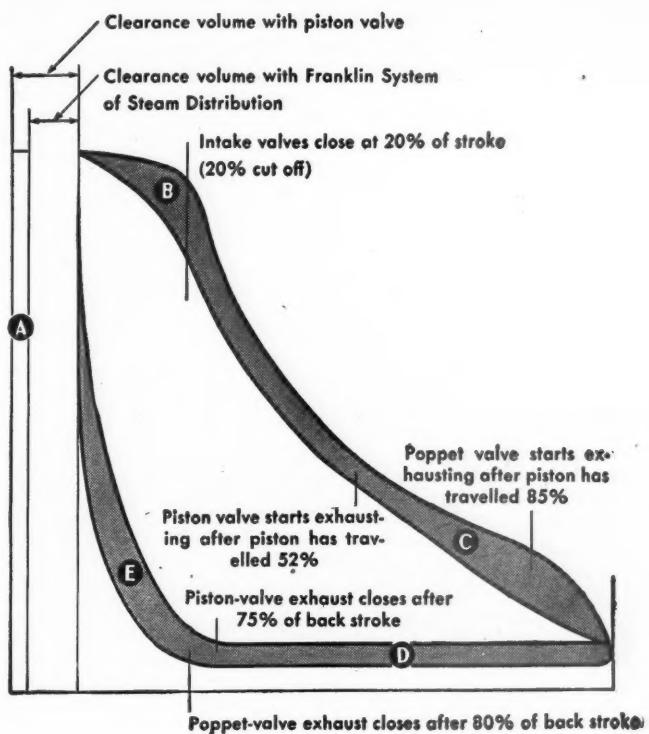
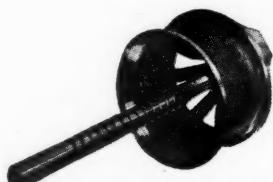
**A** With reduced clearance volume (space between intake valves and piston at end of stroke) more economical use is made of the steam admitted to cylinders.

**B** With larger steam flow areas and faster valve openings, steam enters the cylinder with smaller pressure drop. This increases the amount of steam admitted for a given cut-off — increases the power output for a given cut-off, or permits the use of a shorter and more economical cut-off for a given power output.

**C** With late release, the expansion period is increased substantially. This increases efficiency by increasing the amount of heat transformed into mechanical work.

**D** With late release and large exhaust areas, the back pressure is lower, which again increases the power obtained from a given amount of steam.

**E** With low back pressure, and late compression, excessive pressures at the end of the back stroke are avoided. Economical short cut-offs can be used without severe reactions on the running gear.



## WITH THE FRANKLIN SYSTEM OF STEAM DISTRIBUTION

These indicator cards represent a locomotive equipped with the Franklin System of Steam Distribution and a locomotive, identical in all other respects, equipped with piston valves. Both cards are based on high-speed operation at 20% cut-off.

As can be seen, the engine equipped with poppet valves can utilize full boiler capacity because of the larger steam flow areas and the faster opening and closing of valves. It develops more horsepower per pound of steam. It uses less fuel and water to deliver a given horsepower output.



## FRANKLIN RAILWAY SUPPLY COMPANY, INC.

NEW YORK • CHICAGO • MONTREAL

STEAM DISTRIBUTION SYSTEM • BOOSTER • RADIAL BUFFER • COMPENSATOR AND SNUBBER • POWER REVERSE GEARS  
AUTOMATIC FIRE DOORS • DRIVING BOX LUBRICATORS • STEAM GRATE SHAKERS • FLEXIBLE JOINTS • CAR CONNECTION

## REVENUES AND EXPENSES OF RAILWAYS

MONTH OF JULY AND SEVEN MONTHS OF CALENDAR YEAR 1947

Name of road	Operating expenses					Trans- portation	Total	Operating ratio	Net from railway operation	Railway tax-accruals	Net railway operating income	
	Av. mileage operated during period	Freight	Passenger (inc. misc.)	Way and structures	Maintenance of Equipment							
Akron, Canton & Youngstown	171	\$377,229	\$79,860	\$44,383	\$26,555	\$137,663	\$309,485	78.1	\$86,997	\$34,924	\$35,049	
Atlanta, Topeka & Santa Fe System	13,107	2,867,219	639	494,955	298,117	931,004	2,041,568	67.9	966,073	384,907	99,455	
Atlanta & St. Andrews Bay	7 mos.	5,028,137	5,028,137	5,830,552	7,332,166	172,170	13,865,626	66.0	15,178,035	7,264,336	5,261,217	
Western of Alabama	7 mos.	25,179,592	25,179,592	25,179,592	47,559,069	5,500,006	86,784,307	187,324,298	74.4	64,621,578	35,436,303	26,019,775
Western Coast Line	7 mos.	5,573	57,509,130	14,603,631	62,640	299,944	40,942	5,121	38,955	99,345	65.1	
Charleston & Western Carolina	7 mos.	93	6,804,111	9,227	1,084,468	2,446,025	102,596	128,50	43,141	294,822	59.4	
Baltimore & Ohio	7 mos.	6,193	16,889,015	321,313	64,079	9,936,832	2,391,840	30,870	12,374	161,332	84.7	
Staten Island Rapid Transit	7 mos.	29	1,402,920	2,967	2,446,025	1,024,555	1,024,555	1,024,555	1,024,555	1,024,555	100.0	
Bangor & Aroostook	7 mos.	602	591,980	2,577,562	2,290,293	2,019,6	479,945	487,889	88,830	1,042,731	49,024	
Bessemer & Lake Erie	7 mos.	1,762	4,532,409	2,947,245	2,290,293	3,021,617	4,161,924	681,509	12,648,019	25,127,159	83.7	
Boston & Maine	7 mos.	1,762	34,492,713	8,743,285	4,681,697	25,195,470	4,376,873	4,623,559	86,280,369	168,614,856	82.5	
Burlington-Rock Island	7 mos.	228	289,128	69,660	394,038	44,738	32,883	4,548	1,19,989	47.2	124,54,295	
Cambria & Indiana	7 mos.	35	1,135,591	1,118,188	12,056,250	11,220,611	914,300	3,104,306	118,097	2,739,875	1,795,283	
Canadian Pacific Lines in Maine	7 mos.	234	3,090,622	48,989	3,090,067	91,370	58,157	7,408	1,17,311	2,865,539	92.7	
Canadian Pacific Lines in Vermont	7 mos.	90	113,842	20,711	155,882	51,364	51,397	51,311	1,125,807	1,125,807	100.0	
Central of Georgia	7 mos.	419	16,332,335	3,272,556	21,334,408	2,883,152	2,924	51,311	125,807	135,220	81.8	
Central of New Jersey	7 mos.	419	422	5,526,000	5,533,214	1,238,644	203,391	32,944	960,384	1,541,406	126.5	
Central of Pennsylvania	7 mos.	213	1,418,503	18,322	1,461,860	127,783	22,646	4,677,020	9,07,902	62.1	553,958	
Central Vermont	7 mos.	213	1,418,503	131,156	10,799,983	2,589,826	2,386,506	4,335,235	95,936	2,400,451	92.7	
Chesapeake & Ohio	7 mos.	5,054	18,550,058	263,636	2,564,364	3,070,022	537,036	3,246,637	683,714	17,348,477	18,041,740	
Chicago & Eastern Illinois	7 mos.	910	12,161,642	3,787,226	2,259,079	483,811	1,117,927	11,346	1,590,406	2,686,071	89.4	
Chicago & Illinois Midland	7 mos.	131	544,908	1,177	586,385	101,203	101,849	22,077	156,117	412,701	70.4	
Chicago, Burlington & Quincy	7 mos.	131	4,195,988	6,746	4,455,644	14,571,188	2,350,875	81,911	1,201,365	6,433,693	3,013,166	
Chicago & North Western	7 mos.	8,064	10,778,274	2,589,434	1,021,626	2,211,558	16,008,489	2,623,972	3,096,537	5,024,288	13,389,904	
Chicago, Indianapolis & Louisville	7 mos.	541	1,033,832	1,177,438	8,477,608	228,991	209,966	61,958	525,641	525,641	96.5	
Chicago, Burlington & Quincy	7 mos.	8,866	13,983,017	1,602,444	16,938,129	2,754,674	2,287,726	3,75,925	5,933,278	11,970,942	70.7	
Chicago Great Western	7 mos.	1,500	98,127,309	9,832,538	11,669,422	1,216,604	15,903,863	2,55,666	4,183,872	80,920,176	68.2	
Chicago, Indianapolis & Louisville	7 mos.	1,500	15,144,535	22,979,710	13,872,226	97,607,110	13,156,135	1,25,214	2,461,271	2,461,271	100.0	
Chicago, Burlington & Quincy	7 mos.	541	7,500,117	43,973	20,391	1,177,438	8,477,608	1,810,539	1,255,835	1,255,835	100.0	
Chicago, Burlington & Quincy	7 mos.	541	541	541	541	541	541	541	541	541	541	

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# HEAT LEAKS...

as wasteful as  
steam leaks!

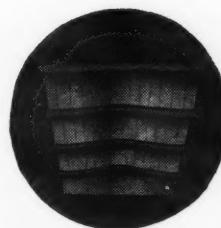
The long runs at high speed demanded  
of today's steam locomotive require  
maximum utilization of fuel.



**TO PREVENT** waste of heat and to secure the greatest possible amount of power from the fuel consumed, a complete brick arch in the firebox should be maintained at all times.

**TO INSURE** the highest boiler steaming efficiency, a suitably proportioned Security-type brick arch for each class of locomotive is essential.

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*Refractories Specialists*



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60 East 42nd Street, New York 17, N. Y.  
*Locomotive Combustion Specialists*

## REVENUES AND EXPENSES OF RAILWAYS

Month of July and Seven Months of Calendar Year 1947—Continued

Name of road	Av. mileage operated during period	Operating revenues—			Maintenance of Way and structures			Operating expenses—			Operating ratio	Net from railway operation	Railway tax accruals	Net railway operating income				
		Freight	Passenger (inc. misc.)	Total	Equipment	Traffic	Trans-	Total	Trans-	Total								
Chicago, Milwaukee, St. Paul & Pacific	10,733	\$14,248,562	\$2,286,551	\$18,476,897	\$3,991,825	\$1,144,333	\$4,715,159	\$7,677,444	\$16,193,050	\$87.6	\$2,283,847	\$1,296,000	\$514,967	\$451,929				
Chicago, Rock Island & Pacific	10,733	102,015,733	12,035,659	126,433,215	21,791,823	20,391,299	2,677,848	5,281,3264	103,285,978	81.7	23,167,397	11,304,000	8,318,254	2,819,151				
Chicago, St. Paul, Minn. & Omaha	7,650	14,132,592	2,199,336	17,432,632	3,351,613	2,391,448	4,027,622	6,068,414	11,880,149	67.9	5,617,483	1,997,515	2,693,223	2,364,459				
Clinchfield	7,650	80,323,189	13,096,900	10,038,402	12,520,834	16,377,400	2,778,638	38,562,588	74,934,461	74.2	26,103,941	9,374,351	11,845,300	9,027,960				
Colorado & Southern	July	1,616	1,933,761	288,666	404,702	459,486	50,423	1,144,837	2,171,027	88.3	287,319	199,026	—34,843	89,424				
Ft. Worth & Denver City	July	1,616	14,158,823	1,458,247	2,157,232	2,529,334	2,946,363	354,426	8,157,018	14,690,817	85.7	2,446,415	1,355,330	—1,448,923	462,371			
Colorado & Wyoming	July	748	5,168,759	689,213	6,406,035	1,127,747	1,268,377	15,998	2,99,003	5,668,455	87.3	822,580	635,334	58,053	9,847			
Columbus & Greenville	July	748	902	6,449,456	902,011	8,832	1,122,449	1,677,431	36,664	961,237	42,084	599,725	326,606	488,794	38,875			
Delaware & Hudson	July	794	3,659,797	1,325,085	920,921	159,727	169,562	381,282	779,626	80.6	187,728	124,211	53,092	83,853				
Delaware, Lackawanna & Western	July	794	973	3,603,014	4,357	961,060	1,243,037	51,644	1,21,477	4,761	4,312,22	1,336,959	111.3	—13,922	152,016			
Denver & Rio Grande Western	July	2,467	4,071,945	1,351,022	4,120,924	5,922,711	897,608	57,662	1,559,030	3,243,791	78.7	877,110	504,893	421,920	305,107			
Detroit & Mackinac	July	2,470	500	2,296,732	4,014,022	1,882,204	31,161,575	6,468,407	41,600	11,466,210	23,045,019	79.3	3,768,308	3,675,339	1,355,375	1,754,146		
Detroit & Toledo Shore Line	July	50	500	3,228,094	2,039	978,075	960,541	6,480,382	925,609	1,021,520	12,621	2,822,632	5,180,809	631,573	220,029			
Detroit, Toledo & Ironton	July	500	464	7,411,879	230	891,677	11,992	5,567,327	7,364,063	920,648	20,726,241	36,047,481	78.6	9,799,704	4,546,390	4,618,076	1,709,636	
Duluth, Missabe & Iron Range	July	547	1,699,409	4,312	19,308	19,799,957	507,194	904,347	13,49,98	1,665,481	3,622,515	77.6	1,047,018	569,013	558,419	431,309		
Duluth, Winnipeg & Pacific	July	547	175	1,281,000	5,299,344	1,284	2,600	288,100	126,530	15,62,828	13,828	33,288	117,627	81.7	6,447,772	3,226,426	14,855	27,125
Elgin, Joliet & Eastern	July	391	2,375,757	1	5,242,282	3,631,173	45,778	37,266	10,911	116,821	220,692	60.8	142,481	44,625	40,434	25,203		
Florida East Coast	July	621	2,229	75,336,246	18,54,736	5,195,155	2,794,215	508,526	3,31,323	7,859	966,392	1,688,832	508,656	560,650	215,807			
Georgia Railroad	July	328	328	4,052,953	741,411	31,225	635,311	1,62,747	15,62,828	18,686	282,842	51,628,888	148,884	194,181	136,645			
Georgia & Florida	July	408	8,333	85,803,667	219,948	2,580	228,891	507,766	3,09,589	1,04,664	10,64,122	215,756	1,370,748	1,840,748	749,661			
Grand Trunk Western	July	972	972	22,471,000	1,040,964	3,508,000	3,125,722	2,155,352	37,497	1,13,691	10,218,66	2,929,029	59,6	151,607	216,466	63,887		
Canadian Nat'l Lines in New England	July	172	172	1,026,244	1,35,000	27,000	176,000	30,693	1,18,745	57,069	2,13,720	20,123	170,118	156,365	389,905	24,494		
Great Northern	July	8,333	8,333	1,020,000	1,410,946	2,458,000	16,155	2,669,834	3,11,74	2,60,681	41,769	6,290,709	13,48,72	121,978	1,207,73	2,32,861		
Great Northern	July	8,333	8,333	3,027,000	1,281,000	3,125,200	635,311	10,570,032	10,570,032	2,63,306	58,102	4,30,950	1,633,576	251,797	18,355	12,989		
Great Northern	July	972	972	1,022,000	4,052,953	1,222,000	25,552,000	3,703,593	4,135,669	15,223,639	1,845,615	37,332,159	67,850,237	79.6	1,384,922	178,767	1,087,787	
Great Northern	July	8,333	8,333	1,022,000	22,471,000	1,022,000	27,000	176,000	30,693	1,18,745	57,069	2,13,720	20,123	170,118	156,365	389,905		
Great Northern	July	8,333	8,333	1,022,000	1,410,946	2,458,000	16,155	2,669,834	3,11,74	2,60,681	41,769	6,290,709	13,48,72	121,978	1,207,73	2,32,861		
Great Northern	July	8,333	8,333	1,022,000	1,281,000	3,125,200	635,311	10,570,032	10,570,032	2,63,306	58,102	4,30,950	1,633,576	251,797	18,355	12,989		
Great Northern	July	8,333	8,333	1,022,000	4,052,953	1,222,000	25,552,000	3,703,593	4,135,669	15,223,639	1,845,615	37,332,159	67,850,237	79.6	1,384,922	178,767	1,087,787	
Great Northern	July	8,333	8,333	1,022,000	22,471,000	1,022,000	27,000	176,000	30,693	1,18,745	57,069	2,13,720	20,123	170,118	156,365	389,905		
Great Northern	July	8,333	8,333	1,022,000	1,410,946	2,458,000	16,155	2,669,834	3,11,74	2,60,681	41,769	6,290,709	13,48,72	121,978	1,207,73	2,32,861		
Great Northern	July	8,333	8,333	1,022,000	1,281,000	3,125,200	635,311	10,570,032	10,570,032	2,63,306	58,102	4,30,950	1,633,576	251,797	18,355	12,989		
Great Northern	July	8,333	8,333	1,022,000	4,052,953	1,222,000	25,552,000	3,703,593	4,135,669	15,223,639	1,845,615	37,332,159	67,850,237	79.6	1,384,922	178,767	1,087,787	
Great Northern	July	8,333	8,333	1,022,000	22,471,000	1,022,000	27,000	176,000	30,693	1,18,745	57,069	2,13,720	20,123	170,118	156,365	389,905		
Great Northern	July	8,333	8,333	1,022,000	1,410,946	2,458,000	16,155	2,669,834	3,11,74	2,60,681	41,769	6,290,709	13,48,72	121,978	1,207,73	2,32,861		
Great Northern	July	8,333	8,333	1,022,000	1,281,000	3,125,200	635,311	10,570,032	10,570,032	2,63,306	58,102	4,30,950	1,633,576	251,797	18,355	12,989		
Great Northern	July	8,333	8,333	1,022,000	4,052,953	1,222,000	25,552,000	3,703,593	4,135,669	15,223,639	1,845,615	37,332,159	67,850,237	79.6	1,384,922	178,767	1,087,787	
Great Northern	July	8,333	8,333	1,022,000	22,471,000	1,022,000	27,000	176,000	30,693	1,18,745	57,069	2,13,720	20,123	170,118	156,365	389,905		
Great Northern	July	8,333	8,333	1,022,000	1,410,946	2,458,000	16,155	2,669,834	3,11,74	2,60,681	41,769	6,290,709	13,48,72	121,978	1,207,73	2,32,861		
Great Northern	July	8,333	8,333	1,022,000	1,281,000	3,125,200	635,311	10,570,032	10,570,032	2,63,306	58,102	4,30,950	1,633,576	251,797	18,355	12,989		
Great Northern	July	8,333	8,333	1,022,000	4,052,953	1,222,000	25,552,000	3,703,593	4,135,669	15,223,639	1,845,615	37,332,159	67,850,237	79.6	1,384,922	178,767	1,087,787	
Great Northern	July	8,333	8,333	1,022,000	22,471,000	1,022,000	27,000	176,000	30,693	1,18,745	57,069	2,13,720	20,123	170,118	156,365	389,905		
Great Northern	July	8,333	8,333	1,022,000	1,410,946	2,458,000	16,155	2,669,834	3,11,74	2,60,681	41,769	6,290,709	13,48,72	121,978	1,207,73	2,32,861		
Great Northern	July	8,333	8,333	1,022,000	1,281,000	3,125,200	635,311	10,570,032	10,570,032	2,63,306	58,102	4,30,950	1,633,576	251,797	18,355	12,989		
Great Northern	July	8,333	8,333	1,022,000	4,052,953	1,222,000	25,552,000	3,703,593	4,135,669	15,223,639	1,845,615	37,332,159	67,850,237	79.6	1,384,922	178,767	1,087,787	
Great Northern	July	8,333	8,333	1,022,000	22,471,000	1,022,000	27,000	176,000	30,693	1,18,745	57,069	2,13,720	20,123	170,118	156,365	389,905		
Great Northern	July	8,333	8,333	1,022,000	1,410,946	2,458,000	16,155	2,669,834	3,11,74	2,60,681	41,769	6,290,709	13,48,72	121,978	1,207,73	2,32,861		
Great Northern	July	8,333	8,333	1,022,000	1,281,000	3,125,200	635,311	10,570,032	10,570,032	2,63,306	58,102	4,30,950	1,633,576	251,797	18,355	12,989		
Great Northern	July	8,333	8,333	1,022,000	4,052,953	1,2												

# HIGH WATER

## *Warning and Preventative*

**When a locomotive is equipped with an Elesco Steam Dryer System, water carryover is immediately indicated by an illuminated red bulb on a panel board in the cab. The carryover is immediately separated from the steam and automatically ejected from the boiler.**

**The warning red flash on the panel board disappears when the engineman adjusts the boiler feed to correct the carryover condition.**

**Every locomotive should be equipped with this essential equipment.**



A-1886

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Superheaters • Superheater Pyrometers • Exhaust Steam Injectors • Steam Dryers • Feedwater Heaters • Steam Generators • Oil Separators • American Throttles

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## REVENUES AND EXPENSES OF RAILWAYS

MONTH OR JULY AND SEVEN MONTHS OF CALENDAR YEAR 1947—CONTINUED

Name of road	Operating revenues			Operating expenses			Operating ratio	Net from railway operation	Railway tax accruals	Net railway operating income	
	Av. mileage operated during period	Freight	Passenger (inc. misc.)	Maintenance of Way and structures	Equipment	Traffic					
Green Bay & Western	234	\$28,832	\$285	\$254,151	\$30,077	\$1,173	85.87%	\$22,965	89.3	\$15,394	
Gulf, Mobile & Ohio	2,904	1,799,873	270	1,800,557	403,241	188,382	9.92	574,680	75.0	146,587	
Illinois Central (System)	2,904	4,554,073	709,742	5,630,954	1,008,966	1,099,569	214,720	1,866,781	78.7	56,135	
Illinois Terminal	2,904	3,356,687	3,872,110	41,351,461	7,017,062	6,859,935	1,354,452	13,457,679	75.0	10,322,020	
Kansas City Southern	890	14,899,802	2,173,906	18,987,668	3,436,587	2,041,481	357,752	6,712,438	75.5	4,656,042	
Kansas, Oklahoma & Gulf	890	109,445,24	14,759,914	167,506,962	22,019,577	23,900,529	2,455,562	48,766,836	70.5	2,389,045	
Lake Superior & Ishpeming	156	1,511,372	613	1,856,542	2,296,653	2,223,878	2,557,676	50,205	14,311,626	919,321	
Lehigh & Hudson River	156	1,211,165	1,284	1,895,248	2,121,210	2,056,873	31,012	6,005,932	60.8	1,927,833	
Lehigh & New England	193	3,571,927	107	534,433	46,038	37,099	1,437	100,904	195,090	1,148,273	
Lehigh Valley	193	4,653,939	613	1,872,160	269,267	246,523	1,055	455,393	57.1	80,320	
Louisiana & Arkansas	7 mos.	7 mos.	7 mos.	7 mos.	7 mos.	7 mos.	7 mos.	7 mos.	7 mos.	7 mos.	
Duluth, South Shore & Atlantic	July	1,408	1,424,678	12,645	1,491,373	2,382,547	168,324	41,024	1,490,777	80.4	
Mississippi Central	July	1,408	9,697,874	1,361,932	13,447,199	2,318,900	2,290,935	124,509	5,890,343	64.8	
Missouri-Kansas-Texas Lines	July	3,224	2,020,718	74,720	10,145,462	1,305,824	1,578,619	65,058	1,209,837	180,496	
Missouri International	July	3,224	14,705,014	26	180,111	56,789	10,619	2,815	5,602,693	1,462,102	
Missouri & St. Louis	July	530	448,503	14,016	497,877	93,457	69,113	14,567	1,130,537	76.2	
Missouri, Kansas & Texas Lines	July	530	2,777,522	8,718	3,035,320	329,513	490,388	1,226,285	2,464,886	570,154	
Missouri & Arkansas	July	152	1,066,153	1,772	1,112,72	40,870	422,693	1,093,558	1,375,338	37,667	
Missouri Central	July	148	124,977	—155	128,254	28,950	16,314	10,037	34,829	73.3	
Missouri-Kansas-Texas Lines	July	365	4,787	—813	1,03,953	237,497	120,352	73,554	20,434	31,456	
Missouri International	July	365	548	343	11,693	1,114,779	251,349	113,764	26,235	10,626	
Missouri-Kansas-Texas Lines	July	3253	5,558,820	4,432,737	6,422,30	5,556,905	5,556,905	5,556,905	1,385,866	15,407,289	1,459,127
Missouri Central	July	172	310,912	470	314,194	65,830	39,316	5,697	87,225	205,652	
Missouri-Kansas-Texas Lines	July	3253	2,227,484	2,447	2,270,885	31,007	247,174	41,790	588,277	1,296,642	974,243
Missouri International	July	3253	5,558,820	4,432,737	6,422,30	5,556,905	5,556,905	5,556,905	1,385,866	1,459,127	1,459,127

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## UNION SWITCH & SIGNAL COMPANY

SWISSVALE

NEW YORK CHICAGO



PENNSYLVANIA

ST. LOUIS SAN FRANCISCO

## REVENUES AND EXPENSES OF RAILWAYS

Month of July and Seven Months of Calendar Year 1947—CONTINUED

Name of road	Av. mileage operated during period			Operating revenues			Operating expenses			Net railway operating income				
	Freight	Passenger	Total	Way and structures	Equipment	Traffic	Transportation	Total	Operating ratio	Railway tax accruals	1947	1946		
Missouri Pacific	7,011	\$14,850,695	\$14,987,070	\$17,551,126	\$2,717,844	\$2,956,621	\$3,79,473	\$13,385,723	76.2	\$4,185,403	\$1,388,281	\$2,125,631		
Gulf Coast Lines	7,030	93,656,884	51,659,942	12,031,500	16,306,931	19,250,978	5,756,925	43,767,900	86.1	5,901,149	8,293,239	12,543,634		
International-Great Northern	7,173	2,911,454	2,94,062	3,45,203	3,66,338	3,86,138	1,098,850	2,19,916	67.9	922,287	2,276,042	481,920		
Montour	7,174	22,911,139	607,401	24,523,761	4,428,443	2,69,944	479,527	1,84,160	16,201,718	66.0	8,362,043	2,126,724	4,098,936	
Monongahela	7,110	13,306,845	2,54,950	2,54,950	2,54,950	437,031	3,99,686	47,969	1,032,511	2,036,491	143,645	236,312		
Nashville, Chattanooga & St. Louis	7,170	5,576,456	1,56,640	16,674,448	3,068,877	2,606,767	313,419	7,387,410	14,201,107	85.2	2,447,742	909,451	184,474	
New York Central	7,052	1,819,044	2,186,800	2,08,074	1,75,912	1,56,189	411,863	400,984	88,341	1,052,529	2,161,749	83.3		
Pittsburgh & Lake Erie	7,052	1,858,020	1,395,152	1,75,912	1,75,912	2,88,686	3,064,124	670,770	7,482,590	14,86,719	82.9	2,223,749		
New York, Chicago & St. Louis	7,052	2,126,117	12,276,375	56,911,955	8,833,881	10,956,285	1,042,831	24,186,941	47,750,862	83.9	9,161,093	5,055,956	2,797,901	
New York, New Haven & Hartford	7,052	2,276,249	72,997,062	39,943,135	51,143,004	51,225,455	6,395,072	175,923	33,728,557	84.2	62,354,751	34,707,901	16,022,011	
New York Connecting	7,052	19,444,286	670,098	20,981,507	2,582,206	5,816,222	384,431	7,760,583	17,54,788	83.7	3,426,719	3,622,944	1,525,765	
New York, Ontario & Western	7,052	1,687	6,440,892	174,902	6,804,015	1,014,237	1,259,837	177,052	5,70,348	80.4	1,333,667	562,745	432,100	
New York, Susquehanna & Western	7,052	1,883	6,112,020	5,28,088	12,602,190	9,151,549	8,771,132	1,256,673	38,07,522	73.2	13,914,717	5,539,944	1,295,223	
Norfolk & Western	7,052	1,839	48,666,861	32,061,867	89,167,728	13,376,547	12,963,612	1,658,179	38,312,953	72,583,946	81.4	2,329,883	790,000	3,087,733
Norfolk Southern	7,052	1,733,351	1,300,561	38,392	72,608	1,066,220	1,708,220	291,105	1,044,334	84.0	1,317,927	409,252	447,757	
Northern Pacific	7,052	547	4,366,200	4,857,276	851,035	803,911	186,883	24,919,670	4,457,632	91.8	400,094	357,546	—875,638	
Northwestern Pacific	7,052	120	263,627	378,652	314,338	35,031	42,885	5,114	143,394	78.8	66,467	37,129	—7,022	
Oklahoma City-Ada-Atoka	7,052	1,964,528	2,76,465	2,35,570	2,22,743	2,199,111	2,145,194	3,82,337	1,722,203	73.1	634,520	358,828	—70,933	
Pennsylvania	7,052	6,919	4,813,405	36,867	5,09,126	1,086,334	1,708,220	291,105	3,55,884	75.6	1,614	52,842	—63,537	
Long Island	7,052	6,920	6,54,365	6,68,280	10,386,220	11,580,621	18,062,096	1,566,883	27,191,503	66.5	30,945,386	17,622,675	1,607,354	
Pittsburg & Shawmut	7,052	6,62,176	4,228,807	4,228,807	4,228,807	13,869,288	15,211,238	1,600,485	27,859,171	62,649,726	81.8	13,925,176	8,828,056	2,288,056
Pittsburgh & Seashore Lines	7,052	6,62,011	9,318	6,47,714	118,292	45,528	4,729	27,717	307,228	85.0	110,303	40,424	39,903	
Railroad	7,052	3,661,559	63,631	3,810,256	75,670	23,116	1,024	1,024	9,145,726	82.2	3,880,334	338,090	229,522	
Richmond, Fredericksburg & Potomac	7,052	1,419,515	1,425,551	62,785	26,595,436	3,368,118	11,7943	19,813	150,115	311,122	67.7	151,017	47,796	—59,513
Rutland	7,052	97	1,419,515	94	468,139	4,371,025	4,371,025	188,580	14,234,162	22,709,033	85.4	3,886,403	3,284,998	—1,520,024

Table continued on next left-hand page.

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*Announcing* **RACOR'S**  
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**RAIL LUBRICATOR**



... that minimizes destructive friction  
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Positive feed of lubricant developed by each passing wheel assures ample and extensive distribution by wheel flanges. Rail life is materially extended — track maintenance substantially reduced. Safer, higher speeds and increased tonnage ratings result when RACOR'S IMPROVED RAIL LUBRICATORS are installed.

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## REVENUES AND EXPENSES OF RAILWAYS

CONTINUATION  
JULY AND SEVEN MONTHS OR CALENDAR YEAR 1947

Av. mileage operated during period	Operating revenues			Operating expenses			Net from railway operation	Net railway operating income
	Freight	Passenger (inc. misc.)	Total	Way and structures	Maintenance of Equipment	Traffic		
Name of road								
St. Louis-San Francisco	July	4,645	\$650,934	\$8,624,642	\$1,284,268	\$1,395,826	\$1,201,459	\$3,632,834
	1 mos.	4,645	4,954,126	\$7,989,022	8,491,516	9,943,319	1,396,591	24,334,635
St. Louis, San Francisco & Texas	July	160	2,131,117	7,602,220	7,404,512	4,184,985	1,911	1,145,540
	7 mos.	160	2,131,117	90,135	2,328,856	356,132	227,011	1,016,885
St. Louis Southwestern Lines	July	1,575	4,120,127	96,955	4,257,400	591,122	129,502	1,416,193
	1 mos.	1,575	2,985,296	6,044,081	30,405,664	4,092,083	3,566,674	865,432
Seaboard Air Line	July	4,156	6,676,550	1,112,772	8,444,110	1,333,488	1,688,442	1,554,145
	7 mos.	4,156	56,021,200	10,204,401	71,330,208	11,436,427	12,214,232	1,885,732
Southern Railway	July	6,484	13,387,822	1,968,173	16,390,219	2,775,201	3,394,677	2,846,744
	1 mos.	6,484	10,672,039	12,027,561	12,998,554	19,245,183	23,477,795	2,304,549
Alabama Great Southern	July	316	1,113,259	1,167,045	1,335,750	1,882,626	280,629	17,754,145
	7 mos.	316	7,770,482	848,349	9,186,390	1,370,220	2,005,799	55,854,397
Cinn., New Orleans & Texas Pacific	July	337	2,425,984	251,651	2,793,224	347,785	564,092	6,628,734
	1 mos.	337	1,236,414	1,630,888	19,761,408	2,301,712	4,022,712	487,794
Georgia Southern & Florida	July	397	2,654,861	827,155	847,447	997,517	1,355,573	1,355,573
	7 mos.	397	2,654,861	655,488	3,608,549	440,951	436,140	50,454
New Orleans & Northeastern	July	204	730,646	83,596	859,740	107,330	100,298	16,446
	1 mos.	204	1,169,053	420,316	591,1786	839,910	631,072	11,731
Southern Pacific	July	8,228	2,174,833	470,855	354,218,108	235,218,108	610,072	638,691
	7 mos.	8,228	188,171	29,392,171	235,218,108	41,603,708	4,429,755	93,344,193
Texas & New Orleans	July	4,320	7,800,527	1,042,035	9,439,392	1,124,800	1,298,128	168,712
	1 mos.	4,320	53,656,348	6,551,815	64,442,766	7,949,164	8,499,300	1,255,399
Spokane, Portland & Seattle	July	944	1,773,207	106,964	1,722,634	650,813	1,722,634	183,900
	7 mos.	944	10,977,815	468,825	12,253,395	2,899,459	1,453,948	123,513
Tennessee Central	July	286	2,58,078	7,857	283,234	61,908	80,911	8,328
	1 mos.	286	2,176,442	592,971	557,280	423,478	505,335	64,423
Texas & Pacific	July	1,854	4,555,814	4,555,814	4,555,814	677,405	667,295	151,015
	7 mos.	1,871	28,190,161	3,330,083	34,388,440	4,524,214	5,338,722	1,03,015
Texas Mexican	July	162	330,139	100	361,970	60,930	20,137	4,743
	1 mos.	162	1,550,253	596,950	1,726,191	423,423	427,555	5,83,692
Union Pacific System	July	9,779	25,987,333	4,596,950	33,355,386	4,554,097	5,83,692	666,619
	7 mos.	9,776	175,078,650	26,373,787	218,931,349	29,531,600	37,941,322	5,005,450
Utah	July	111	100,206	100	100,545	30,282	44,358	4,792
	1 mos.	111	1,147,211	1,147,211	1,147,211	189,323	320,904	4,639
Virginia	July	6,661	2,138,992	3,342,020	53,334,517	5,767,173	7,290,442	1,524,276
	7 mos.	6,661	19,478,717	41,377	20,693,743	2,187,560	4,532,960	240,193
Wabash	July	3,393	6,322,703	3,549,318	7,393,266	1,67,562	1,090,458	24,336
	1 mos.	3,393	4,674,442	3,283,776	5,334,209	5,767,173	7,290,442	1,524,276
Ann Arbor	July	294	5,537,560	7,347	5,593,725	3,042,266	3,329,617	322,996
	7 mos.	294	4,198,925	31,169	4,367,061	558,396	850,610	144,393
Western Maryland	July	837	2,920,786	22,003	3,089,679	500,358	706,298	60,102
	1 mos.	837	22,558,076	3,134,209	53,334,517	1,726,191	2,010,968	4,78,042
Western Pacific	July	1,195	19,056,156	1,310,896	21,011,890	3,871,470	3,382,408	855,146
	7 mos.	1,195	19,056,156	1,310,896	21,011,890	3,871,470	3,382,408	855,146
Wheeling & Lake Erie	July	505	2,287,906	13	2,413,824	340,105	389,251	59,505
	1 mos.	505	15,799,288	1,142,667	2,426,913	2,470,221	379,722	5,158,007
Wisconsin Central	July	1,051	1,658,322	3,283,776	5,194,995	10,927,652	12,922,756	1,570,308
	7 mos.	1,051	16,658,003	1,142,667	1,142,667	1,142,667	1,142,667	1,142,667



## GENERAL NEWS

(Continued from page 73)

### Safety Council Seeks Members

John E. Long, superintendent of safety of the Delaware & Hudson, has been appointed "roundup boss" of the Steam Railroad section of the National Safety Council for that organization's fall drive for new members. The roundup, which will extend from October 1 through December 31, is designed to add to the council's present membership of some 7,500 industrial and commercial concerns cooperating in the prevention of accidents.

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... BECAUSE OF ECONOMIES RESULTING FROM MASS PRODUCTION OF MAJOR UNITS IN CLARK'S OWN PLANTS—ASSEMBLY-LINE PRODUCTION OF FORK TRUCKS, BOTH ELECTRIC AND GAS-POWERED—MAXIMUM INTERCHANGEABILITY BETWEEN GAS AND ELECTRIC MACHINES OF LIFT MECHANISMS, AXLES, WHEELS AND MANY OTHER PARTS.

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### Trend of Rail Wages Analyzed by Monroe

(Continued from page 68)

railroads' labor payment per hour of work performed should include the payroll taxes paid "solely for employee benefits" of the Railroad Retirement and Railroad Unemployment Insurance acts. As thus expanded, the figure of 119.8 cents for average hourly earnings of employees, other than executives, officials, and staff assistants, during this year's first quarter becomes 130.3 cents. The latter, which still includes no allowance for the cost of paid vacations, is 61.9 per cent above the comparable figure for 1939's first quarter, and 24.6 per cent above 1944.

**Non-ops' Pay Scale**—The breakdown by employee groups shows that non-operating workers averaged, for this year's first quarter, 106.4 cents in hourly earnings on the basis of an average straight-time hourly rate of 103.1 cents. The average weekly compensation of the group was \$52.54. As Mr. Monroe points out, the non-ops include "a large proportion of unskilled labor." Yet he finds that the minimum rate of pay "generally effective" on the railroads is 75½ cents per hour, \$6.04 for an eight-hour day, and \$36.24 per week. An exception to the 75½-cents-per-hour minimum is noted in the case of dining-car waiters with their average rate of 72.9 cents; but it is also noted that the rate for waiters is exclusive of tips.

The average hourly earnings of operating employees during this year's first quarter is shown as 156.4 cents, their average straight-time rate having been 128.8 cents, and the weekly compensation per employee \$77.14. The latter is 60.2 per cent above the comparable figure for 1929's first quarter and 13.2 per cent above 1944. A table setting the ops' first-quarter earnings by occupations shows that passenger engineers were then averaging \$102.76 per week, while freight engineers were averaging \$100.15. Other weekly averages shown include: Passenger conductors, \$90.82; freight conductors, \$92.46; passenger firemen, \$86.63; freight firemen, \$74.60; passenger brakemen and flagmen, \$71.94; freight brakemen and flagmen, \$71.85; yard engineers, \$79.08; yard firemen, \$61.28; yard conductors, \$79.85; yard brakemen, 65.08.

General wage changes in the railroad in-

dustry since 1920 are next discussed by Mr. Monroe in a chapter which closes with a tabular summary of such changes. He then proceeds to his comparisons of railroad-employee wage rates and earnings with those of employees in manufacturing industries. Figures for the latter are based on data of the Bureau of Labor Statistics, U. S. Department of Labor, while the railroad figures are those which exclude executives, officials and staff assistants. The comparison shows that in March, 1947, the average hourly earnings of "all production workers in all manufacturing industries" stood at 118 cents, their average straight-time hourly rate being 114.2 cents. The respective figures for railroad employees were 119 cents and 116 cents.

**Average Earnings** — As to average weekly earnings, the railroad employees were getting \$58.84 last March as compared with \$47.72 for the "production workers." This \$9.98 per week spread in favor of railroad employees compares with \$7.64 in 1929, 6.84 in 1942, \$5.98 in 1943, \$5.36 in 1944, and \$7.01 in 1945. "Average weekly earnings of railroad employees of \$51.44 in 1944 were exceeded by workers in certain of the individual manufacturing industries," the comment on these comparisons says. It adds, however, that in March, 1947, "not one of the individual manufacturing groups of industries" reported weekly earnings as great as the weekly earnings of \$58.84 received by the railroad employees.

And, here again, Mr. Monroe emphasizes the more favorable pension and unemployment-insurance arrangements in the railroad industry, pointing out that the payroll taxes paid by the carriers now total 8 1/4 per cent "in sharp contrast to the rate of 2.7 per cent levied on industries other than the railroads." The recalculation of the hourly-earnings comparisons to allow for this factor shows that the March, 1947, "labor payment per hour of work" was 129.4 cents on the railroads as compared with 121.2 cents in the manufacturing industries.

**Compared to Industry** — Meanwhile, Mr. Monroe had found coal mining to be the only one of the non-manufacturing industries where the average weekly earnings were greater in March, 1947, than those of railroad employees. The average for bituminous miners was \$64.90, while the anthracite miner received 64.84. Another comparison is that of farm wage rates (without board) with the wage rates of railroad track labor, it being pointed out that farmers are often "in direct competition" with the railroads for this class of workers. This comparison shows that in July, 1946, when the average for farm labor was \$106 per month, railroad extra gang men were averaging \$173.26 per month, section men, \$171.87, and other maintenance of way laborers, \$181.10.

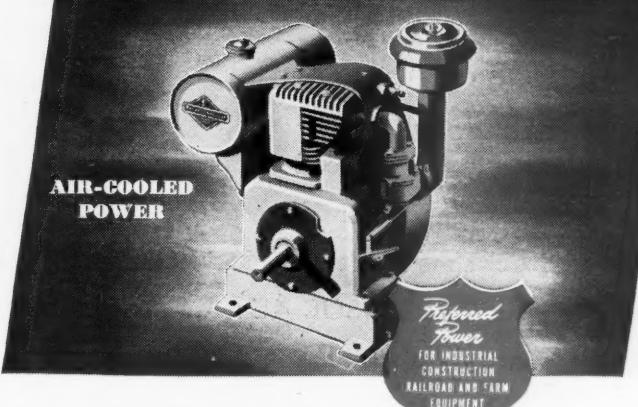
On the basis of purchasing power in terms of "1935-1939 dollars," the average weekly wage of railroad employees in March, 1947, comes down from \$58.84 to \$37.65, while the average for "production workers" drops from \$47.72 to \$30.53. The figures also show that compared with the war year of 1944, these "real" weekly

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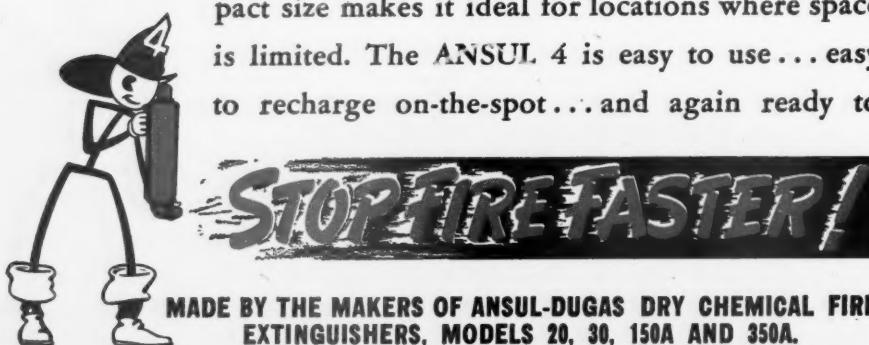
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earnings of railroad employees in March, 1947, were off \$3.34 per week; those of the "production workers" were off \$5.36 per week. There are in the pamphlet other like comparisons of "spendable earnings" (gross weekly earnings less federal income taxes), and "real spendable earnings," i. e., the "spendable earnings" converted into the equivalent of "1935-1939 dollars."

In his discussion of "productivity," Mr. Monroe quotes pronouncements of the Bureau of Labor Statistics to support his view that advances along that line are due to the "combination of the contribution of capital, management, and labor towards progress." Thus he objects to the term "productivity of labor."

"It is evident," he says, "that the mathematical process of dividing total production units by total labor units does not produce a result that measures labor efficiency. The measure is more aptly described as 'productivity of industry.'"

**Work Output Declining**—Mr. Monroe's analysis of data on output per man-hour leads him into the prediction that the railroad index will recede still further from its wartime high while the index for peacetime manufacturing industries will rise to higher levels. In this connection, he argues that the railroad index of the war period was most favorably affected by the near-capacity utilization of railroad plant and manpower shortages. Meanwhile, non-munitions manufacturing industries were prevented during the war period from introducing new production methods.

Data compiled by the Interstate Commerce Commission's Bureau of Transport Economics and Statistics are reproduced to show the differing trends of traffic units per hour paid for and per dollar of compensation. The index number for the latter (on the basis of 1939 as 100) was down to 86.2 in this year's first quarter, even though the index of traffic units per hour paid for was 134.9.

"The railroad industry," Mr. Monroe here observes, "will require a further increase in productivity to catch up with the increase in unit labor costs already experienced. When productive output increases faster than unit labor costs, workers stand to benefit through an increase in their standard of living. When unit labor costs increase faster than productive output, there is a strong probability that the purchasing power of the people of the country will be reduced."

After next telling briefly of improvements in the efficiency of railroad operations, Mr. Monroe comes to his final chapter on the "magnitude of railroad employment and payrolls." There he has figures to show that the direct wage bill of the railroads "consumes a larger proportion of the revenue dollar than the direct wage bill in most manufacturing industries." It took 52.1 cents in 1946, as compared with about 20 cents for manufacturing industries as a whole. Also reproduced is that table from the I. C. C.'s latest annual report which undertakes to show the "proportion of railroad revenues available for wages and salaries and for investors." The tabulation indicates that,

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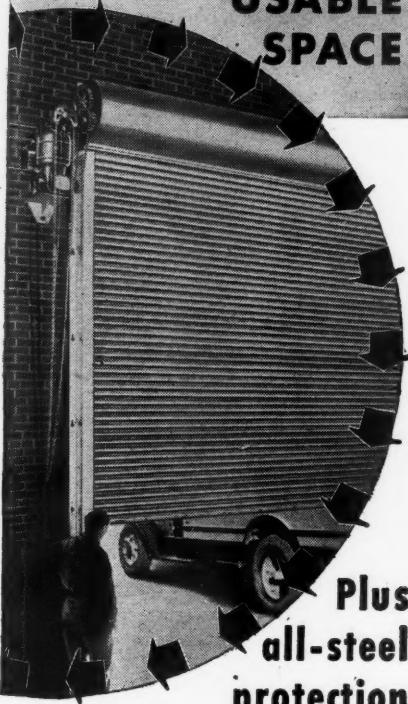
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as Mr. Monroe puts it, "the cost of labor is taking a continuously larger relative proportion of the revenues of the railroads, while the proportion available to investors is shrinking."

### Transport Association Elects

Eight new members—including the presidents of two railroads—have been elected to the board of directors of the Transportation Association of America. The new members are Fred G. Gurley, president of the Atchison, Topeka & Santa Fe; R. E. Woodruff, president of the Erie; A. G. Anderson, general traffic manager, Socony-Vacuum Oil Company; J. L. Burke, vice-president, Stanolind Pipe Line Company; W. A. Patterson, president, United Air Lines; J. A. Quinlan, vice-president, St. Regis Paper Company; B. M. Seymour, president, Associated Transport, Inc.; and C. R. Smith, chairman, American Airlines.

### July Accident Statistics

The Interstate Commerce Commission has made public its Bureau of Transport Economics and Statistics' preliminary summary of steam railway accidents for July and this year's first seven months. The compilation, which is subject to revision, follows:

Item	Month of July		7 months ended with July	
	1947	1946	1947	1946
Number of train accidents*	1,289	1,442	9,723	8,724
Number of casualties in train, train-service and nontrain accidents:				
Trespassers:				
Killed	156	178	771	848
Injured	127	142	657	631
Passengers on trains:				
(a) In train accidents*				
Killed	43	57	33	46
Injured	43	57	775	898
(b) In train-service accidents				
Killed	1	5	21	31
Injured	321	324	1,616	1,653
Travelers not on trains:				
Killed	1	1	6	9
Injured	75	75	539	577
Employees on duty:				
Killed	46	45	437	371
Injured	3,071	3,345	20,996	22,083
All other nontrespassers:**				
Killed	154	127	1,155	1,143
Injured	441	403	3,805	3,739
Total — All classes of persons:				
Killed	358	356	2,423	2,448
Injured	4,078	4,346	28,388	29,581

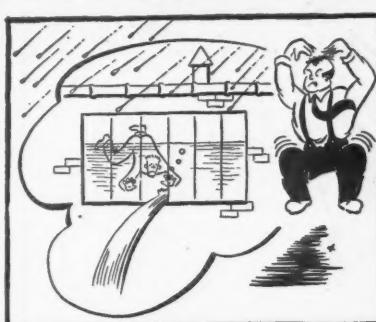
\* Train accidents (mostly collisions and derailments) are distinguished from train-service accidents by the fact that the former cause damage of more than \$150 to railway property.

\*\* Casualties to "Other nontrespassers" happen chiefly at highway grade crossings. Total highway grade-crossing casualties for all classes of persons, including both trespassers and nontrespassers, were as follows:

Persons:	1947	1946	1947	1946
Killed	141	114	1,056	1,050
Injured	258	224	2,350	2,389

### Bank Executive Asks Shippers to Support Rate Increases

American railroads deserve better treatment at the hands of the rate-making authorities, industry and the general public, John J. Rowe, president of the Fifth



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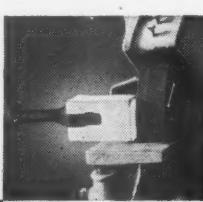


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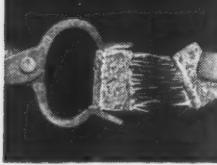
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Third Union Trust Company, Cincinnati, Ohio, said in the bank's recently-released August bulletin. Except for the bitter experience during the first world war, when the government ran the railroads, the railroad industry under private enterprise has performed a phenomenal service for the country, he added. "Since 1930, whether we like to believe it or not," Mr. Rowe continued, "the railroads have actually been in partial liquidation, largely as a result of 'too little, too late.'"

"We firmly believe that the prosperity of our country as a whole is linked with railroad prosperity," Mr. Rowe said.

"With industry progress must go railroad progress, but it must be remembered that new equipment and better facilities are predicated on that firm financial rock of earnings—earnings beget confidence, confidence begets credit. With credit our roads can seize opportunities opened up by prospective new motive power and other important technical improvements. Can the American public and the American shippers be so shortsighted as not to support and assist by accepting needed revenue increases in this vital and important 'department' of their own business?"

### Selected Income and Balance-Sheet Items of Class I Steam Railways

Compiled from 126 reports (Form IBS) representing 130 steam railways  
(Switching and Terminal Companies Not Included)

	All Class I Railways			
	For the month of June		For the six months of	
	1947	1946	1947	1946
<b>Income Items</b>				
1. Net railway operating income	\$60,201,058	\$37,824,949	\$368,422,991	\$154,762,585
2. Other income	23,124,233	22,156,618	98,219,658	91,370,398
3. Total income	83,325,291	59,981,567	466,642,649	246,132,983
4. Miscellaneous deductions from income	4,595,516	2,385,619	20,401,017	13,512,687
5. Income available for fixed charges	78,729,775	57,595,948	446,241,632	232,620,296
6. Fixed charges:				
6-01. Rent for leased roads and equipment	10,856,010	10,706,019	64,063,876	58,185,366
6-02. Interest deductions <sup>1</sup>	25,675,864	28,506,422	155,095,540	176,259,961
6-03. Other deductions	145,157	122,053	856,949	723,856
6-04. Total fixed charges	36,677,031	39,334,494	220,016,365	235,169,183
7. Income after fixed charges	42,052,744	18,261,454	226,225,267	*2,548,887
8. Contingent charges	3,650,353	3,074,502	21,208,461	18,811,883
9. Net income <sup>2</sup>	38,402,391	15,186,952	205,016,806	*21,360,770
10. Depreciation (Way and structures and equipment)	29,478,529	28,262,205	175,255,392	170,497,049
11. Amortization of defense projects	1,355,617	821,397	8,118,922	3,917,776
12. Federal income taxes	20,548,355	3,134,768	143,911,889	12,361,505
13. Dividend appropriations:				
On common stock	11,562,292	16,632,422	70,525,985	83,683,063
On preferred stock	5,438,630	5,591,614	22,244,546	25,192,795
Ratio of income to fixed charges (Item 5 ÷ 6-04)	2.15	1.46	2.03	0.99

	All Class I Railways	
	Balance at end of June	
	1947	1946
17. Expenditures (gross) for additions and betterments—Road	\$118,814,093	\$100,759,524
18. Expenditures (gross) for additions and betterments—Equipment	231,789,631	117,760,800
19. Investments in stocks, bonds, etc., other than those of affiliated companies (Total, Account 707)	578,556,038	586,592,419
20. Other unadjusted debits	185,155,401	175,532,105
21. Cash	992,066,692	972,414,545
22. Temporary cash investments	949,508,089	1,255,058,681
23. Special deposits	174,685,443	186,325,184
24. Loans and bills receivable	209,413	454,533
25. Traffic and car-service balances—Dr.	46,645,325	42,257,289
26. Net balance receivable from agents and conductors	123,645,067	108,123,482
27. Miscellaneous accounts receivable	288,950,913	358,011,506
28. Materials and supplies	734,253,587	611,030,772
29. Interest and dividends receivable	16,588,340	21,974,701
30. Accrued accounts receivable	146,203,482	189,206,738
31. Other current assets	40,831,644	31,931,205
32. Total current assets (items 21 to 31)	3,513,587,995	3,776,788,636
40. Funded debt maturing within 6 months <sup>3</sup>	144,333,337	111,299,810
41. Loans and bills payable	4,275,000	11,054,058
42. Traffic and car-service balances—Cr.	86,036,323	114,775,312
43. Audited accounts and wages payable	477,305,304	485,060,007
44. Miscellaneous accounts payable	219,350,964	178,451,124
45. Interest matured unpaid	58,214,973	63,231,068
46. Dividends matured unpaid	15,927,444	15,895,555
47. Unmatured interest accrued	52,368,585	49,903,319
48. Unmatured dividends declared	12,572,492	18,709,276
49. Accrued accounts payable	160,912,957	188,286,430
50. Taxes accrued	542,511,077	591,478,210
51. Other current liabilities	116,060,298	108,028,292
52. Total current liabilities (items 41 to 51)	1,745,535,417	1,824,872,651
53. Analysis of taxes accrued:		
U. S. government taxes	412,057,352	457,517,403
Other than U. S. government taxes	130,453,725	133,960,807
54. Other unadjusted credits	353,637,118	393,702,483

<sup>1</sup> Represents accruals, including the amount in default.

<sup>2</sup> After a deduction of \$360,589, taken out of operating revenues to create reserves for land grant deductions in dispute.

<sup>3</sup> Includes payments of principal of long-term debt (other than long-term debt in default) which will become due within six months after close of month of report.

\* Decrease, deficit, or other reverse item.

Compiled by the Bureau of Transport Economics and Statistics, Interstate Commerce Commission.

Subject to revision.